GAME ON WITH MSI'S GT70 DRAGON EDITION 2

SONY'S XPERIA Z GETS THE TABLET TREATMENT

PLUS: WHAT'S IN STORE FOR WINDOWS 8.1

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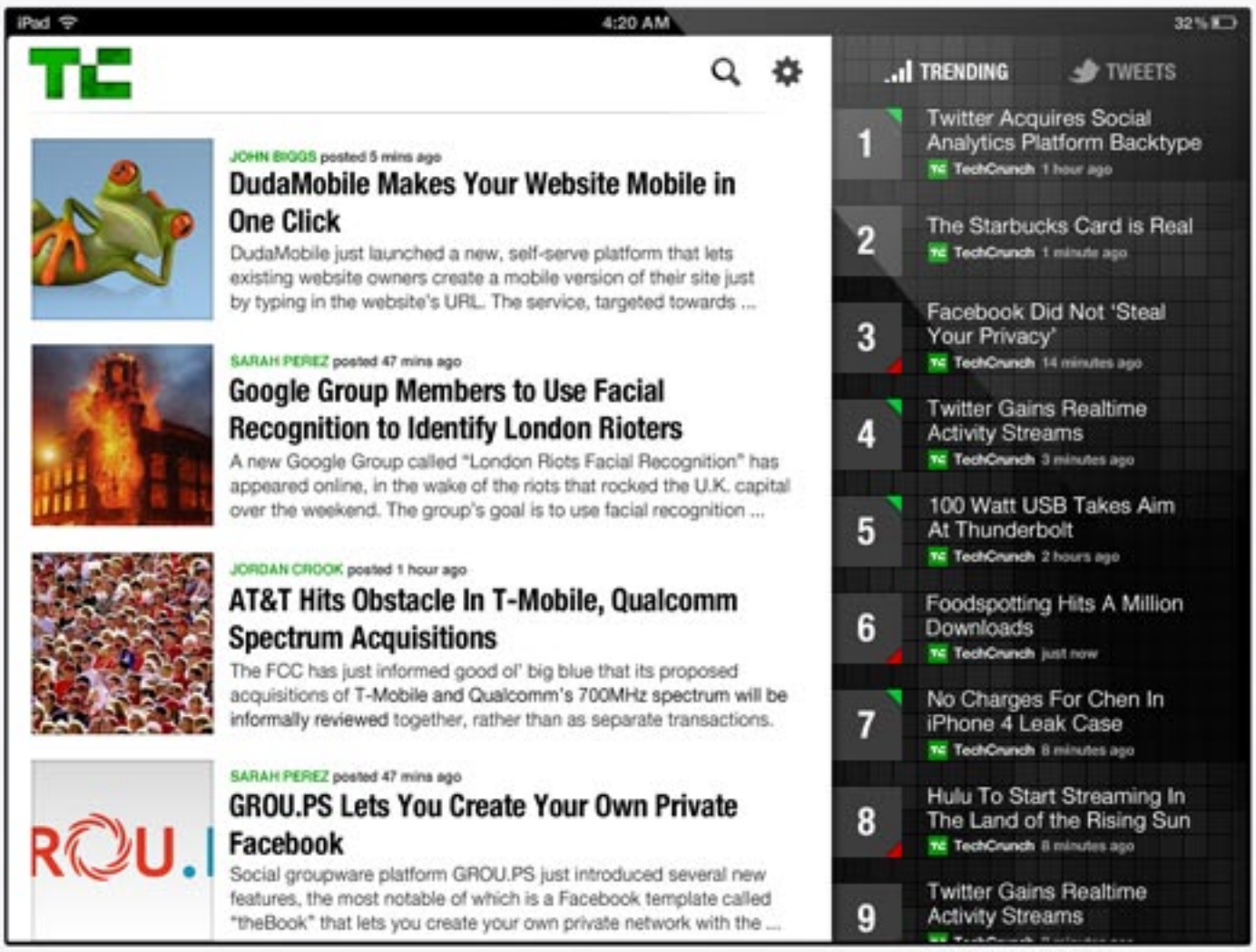

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IRL
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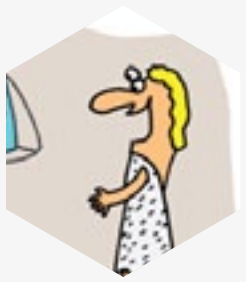


REHASHED
Funky Fresh, Boring Bans and OS Cliques

TM

TIME MACHINES
Palmtop Processing

On the Cover:
Illustration by John Hersey for Distro

EXPAND HEADS EAST

DISTRO
06.07.13

EDITOR'S LETTER

It seems like just yesterday we were in San Francisco at the Fort Mason Center having a heck of a time with robots, exoskeletons, electric cars, UAVs and a huge collection of incredible people. It's actually been almost three months since our amazing inaugural Expand event — and now I can finally say how far we are from kicking off the second. Expand NY is happening at the Javits Center on November 9th and 10th and it's going to be bigger and better than our first event. How so? Stay tuned to find out.

Much farther out east, Computex was in full swing this week and if you didn't catch any of the news, you're not alone: a fair share of it happened in the wee hours of the morning for those of us in the US. Such is the peril of making international product launches in a country half a world away, but we had our team on the ground reporting and getting impressions of all the goods, most of which were laptops, tablets and various permutations in between.

Despite being far away from home, Dell had one of the more interesting showings: the XPS 11. It's a convertible tablet / laptop, much like the Lenovo Yoga. However, where the Yoga is left with its physical keys flapping in the breeze on the back when folded up, Dell decided to go with a flat, membrane-style keyboard, not dissimilar to the Touch Cover Microsoft released with the Surface. I can't imagine the typing experience will be very good, but then maybe I'm still scarred from learning BASIC programming on the Atari 400.

ASUS predictably had a slew of great-looking laptops at Computex as well, including the Gorilla Glass-backed Zenbook Infinity, which manages to be 14 percent thinner than previous models in the line. If you can't decide between Windows and Android, you might instead be interested in the dual-booting Transformer Book Trio, which will run either OS — but interestingly only when in its keyboard dock. Pop it out and it's exclusively Android.

For those ready to commit to one OS, there's the new Transformer Pad Infinity with a healthy 2,560 x 1,600 LCD and the ability to output 4K video via HDMI. Little more is known beyond it having 32GB of internal storage and a 1.9GHz quad-core Tegra 4 chipset inside. And, to round up ASUS, the com-

EDITOR'S LETTER

> "Users of Google's mobile OS can now get their 15 minutes of fame sliced into 150 six-second chunks."

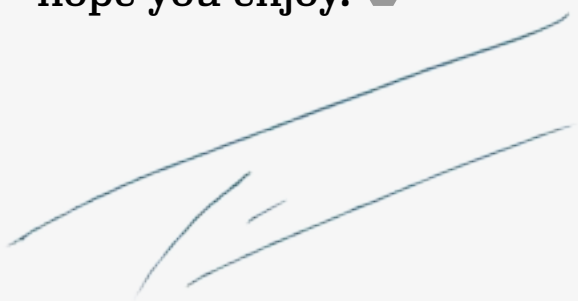
pany introduced its Galaxy Note-hunting (both in terms of size and name) 6-inch FonePad Note smartphone and, for those looking for a Nexus 7 minus the Nexus and plus microSD support, the MeMo Pad HD 7 is coming to the US for just $149.

Moving away from Computex, the ITC dropped a bombshell this week with Samsung winning a patent dispute against Apple that saw some AT&T-compatible iPhones and iPads banned from import into or sale within the US. These are, admittedly, older models of the devices and so their restriction isn't a massive blow to the folks in Cupertino, but it is certainly a blow nevertheless.

Speaking of patents, the Obama administration focused its attentions under the nation's legislative bridges with a promise to reduce the modern scourge of "frivolous litigation." Basically, they're going after patent trolls. This is, of course, a difficult topic, as patent law is largely what enables companies to invest in research and development in the US, but an Obama administration official told us that they would specifically not be attempting a massive reboot of patent legislation. Rather, they're more specifically targeting those whose patent behavior has been deemed to be "abusive."

Finally, Twitter has at long last brought the Vine app to Android. Four months after hitting iOS, users of Google's mobile OS can now get their 15 minutes of fame sliced into 150 six-second chunks. Android users even got one new feature in exchange for waiting: the ability to zoom. Happy day.

In this week's Distro we're taking you inside Verizon's Innovation Center, where the company is desperately striking back against the notion of being a dumb pipe. We also have a fascinating interview with digital composer and music pioneer David Cope. Reviews include the water-resistant Sony Xperia Tablet Z, the water-averse MSI GT70 Dragon Edition 2 and, if that weren't enough, we have Dana Wollman's deep-dive on the Windows 8.1 update — and its new Start button. All that plus new editorials from Ross Rubin and Joshua Fruhlinger, plus Syfy's robot expert Mark Setrakian sits down for Q&A. Regardless of what time zone you're in, I hope you enjoy.



TIM STEVENS
EDITOR–IN–CHIEF,
ENGADGET

A FRESH START, SUBDERMAL TECH AND WEANED OFF QWERTY

Touch article names to read full threads

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06.07.13

INBOX

WINDOWS 8 GETS ITS START BACK
ISSUE 93,
MAY 31ST, 2013

"I will be so peeved if this new start button messes up Start8!"

—TACTICALTIMBO

"Just move your mouse to the bottom left corner and click. Doesn't everyone do this? I've had people use my Windows 8 computer and they just did that by muscle memory. Didn't even notice the little Windows

BLACKBERRY'S DEPRESSING KEYBOARD TRENDS
ISSUE 93,
MAY 31ST, 2013

"Here's the problem with having a physical keyboard on smartphones (& future smartphones): There is an entire generation that is growing up sans physical keyboard on smartphones, Android and iOS. Why is this important? It's important because the generation that never had a physical keyboard WILL NOT develop the smartphone of the future with a physical keyboard. They have successfully managed their lives with a virtual keyboard and that generation is the next generation of engineers, developers and designers."

– SWILSON191

logo wasn't there."

— PETERF

HP ENVY ROVE 20
ISSUE 93,
MAY 31ST, 2013

"This thing plays *Monopoly*? I'm sold. I don't know if there is a huge market for these kinds of 'portable all-in-one' devices but HP certainly has gone all in. I hope I am wrong because these devices do look pretty sweet. I will have to stay tuned to get a review when it comes out."

— SCOTTSIMPSON

"Am I reading this correctly, it is a 720p IPS display on a 20-inch tablet/AIO? No thank you. Nowadays we have 4.7-inch phone displays with 1080p resolution."

— HIGHMAX888

KEVO KEYLESS ENTRY SYSTEM
ISSUE 93,
MAY 31ST, 2013

"Would be a lot cooler with NFC capabilities!!!"

— REVS1227

"So I am guessing here but this also should record entry logs... which would be great for knowing who goes or comes when.

It is coming to the point that front doors no matter what should be locked always. So my solution is no deadbolt at all but a lock that locks every time [the] door closes unless set to stay open say for like a party. Also there absolutely needs [to be] a way to remote lock/unlock device. I could also see a camera taking a photo of anyone accessing [the] door for security."

— FOREMORE

THE MINDS BEHIND XPRIZE
ISSUE 93,
MAY 31ST, 2013

"Saw Peter Diamandis speak at a conference last month in Las Vegas which was absolutely amazing! It's awesome that people like him are working towards driving innovation! The telepresence robot idea was kinda goofy but a cool concept nevertheless."

— DANIELSCHIADA

THE ENGADGET INTERVIEW: THAD STARNER
ISSUE 93,
MAY 31ST, 2013

"IMO, wearable technology sounds a lot better on paper than it is practical. I think there will be a time where you will wear a computing device… but it will be under your skin and tied in to your neural net! This wearable stuff for most part is wishful thinking or niche devices."

— PAUL

HUAWEI ASCEND MATE
ISSUE 93,
MAY 31ST, 2013

"I'll never be able to go back to that tiny 5.5-inch Note 2 again."

— NATESUMMERS

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EYES-ON

FUJIFILM X20

ADVANCED VIEWS

TWO-TONE

Tap for detail

CLASSIC AESTHETICS

RETRO SNAPSHOOTING
An affinity for the look and feel of classic, iconic cameras has taken root in many of the new releases companies are cranking out. Fujifilm's X20 follows suit, offering dapper looks in its follow-up to the retro-styled X10. Here, two-tone exteriors pair with other improvements to complete the package.
THE DAMAGE: $600

PHOTOGRAPHS BY WILL LIPMAN

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EYES-ON

FUJIFILM X20

ADVANCED VIEWS
The optical viewfinder touts two aspherical lenses and two glass prisms that lend a hand with 85 percent coverage and a 20-degree horizontal field of view.

PHOTOGRAPHS BY WILL LIPMAN

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EYES-ON

FUJIFILM X20

TWO-TONE
Like many of its predecessors, the X20 is wrapped with a textured, leather-like black band and wields both two-tone silver and all-black options.

PHOTOGRAPHS BY WILL LIPMAN

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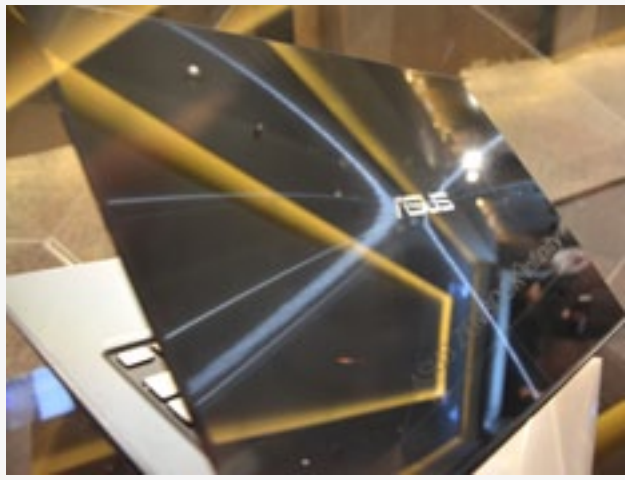
DISTRO
06.07.13

EYES-ON

FUJIFILM X20

CLASSIC AESTHETICS
While the frame and dials feed the classic look, the housing is forged out of lightweight magnesium to keep its mass in check.

PHOTOGRAPHS BY WILL LIPMAN



ASUS ZENBOOK INFINITY

Click on product names to read full stories

Just as promised, ASUS unveiled its Zenbook Infinity at Computex 2013 in Taipei. Being the first laptop — let alone an Ultrabook — to boast a Gorilla Glass 3 lid and palm rest, it's able to take advantage of three times the scratch resistance than the material's predecessor. This has allowed ASUS to achieve a maximum thickness of just 15.5mm, or about 14 percent thinner than the previous line of Zenbooks. But would the glass survive a drop? According to a product manager, the laptop's passed various drop tests, but only time will tell if it's as good as he promised.

Despite the slimmer body, the Zenbook Infinity surprises us with a built-in touchscreen as well as a backlit keyboard. There's also a USB 3.0 port on each side, along with an SD card slot, micro-HDMI port and a Mini DisplayPort. No word on the other specs or prices just yet as this laptop won't be out until Q4.

PRICE: TBD

AVAILABILITY: Q4 2013

THE BREAKDOWN:

THIS ASUS ZENBOOK IS THE FIRST LAPTOP TO SPORT A GORILLA GLASS 3 LID AND PALM REST TO SLIM DOWN TO 15.5MM.

ACER ICONIA W3

Click on product names to read full stories

It looks like the promise of smaller Windows 8 tablets has been fulfilled, and Acer's revealed its plans for a smaller form factor. Yep, we heard word of the 8-inch Iconia W3, but it was unveiled in earnest at Computex 2013, weighing just over a pound and measuring under half an inch thick. Acer's promising around eight hours of battery life, while that smaller screen can still beam out 720p video playback on its 1,280 x 800 display. Better still, Acer has added in a full version of Office free with the tablet, which should go well with the optional full-size keyboard accessory.

The Iconia W3 also houses Intel's dual-core 1.8GHz Atom Z2760 processor, one we've already seen on larger Windows 8 slabs, and will have either 32 or 64GB of internal storage, with additional space possible through microSD expansion. A built-in micro-HDMI port should also ensure displaying content on larger screens is relatively painless, although the tablet does lack the plethora of ports found on its bigger brothers, like USB 3.0 or Thunderbolt.

It was initially an odd sensation to use Windows 8 on a screen substantially smaller than what we've become accustomed to, but it's not an unpleasant one. We have to admit: it feels a little cheaply made, but given the $379 (or 329 euro) price tag, it's about appropriate. The screen is unfortunately harder to forgive, with dull colors and a surface that's very difficult to discern under bright light. Viewing angles are also pretty mediocre. The OS runs fluidly on Intel's Atom processor, with smooth transitions between desktop mode and its Modern counterpart.

The keyboard dock is apparently a work in progress — several teething issues on this development sample will be fixed ahead of launch. While it's a relief to see a keyboard larger than the 8-inch tablet itself, this one, like Acer laptops generally, feels a little flimsy and cramped under the fingers.

PRICE: $379
AVAILABILITY: JUNE 2013
THE BREAKDOWN: ACER'S 8-INCH WINDOWS 8 SLATE LIVES UP TO ITS PRICE TAG WITH A KEYBOARD DOCK IN TOW.

DELL XPS 11

PRICE: TBD
AVAILABILITY: LATE 2013
THE BREAKDOWN: DELL'S 11.6-INCH ULTRABOOK LOOKS TO TAKE ON LENOVO'S YOGA LINE WITH A SURFACE-STYLE KEYBOARD.

Click on product names to read full stories

Just a short while ago we brought word that Dell had quietly announced the Dell XPS 11, an 11.6-inch Ultrabook with a hinge that folds all the way back into tablet mode, with the keyboard disabled after it passes 180 degrees. Yep, it is what it sounds like: a direct strike at Lenovo's Yoga convertibles. It won't be available until the holiday season, but fortunately we just had a chance to get hands-on with a prototype unit here at Computex.

At this early stage, Dell can't comment on certain particulars, but it has committed to this: a 2,560 x 1,440 IPS display, something we've never actually seen on a Dell laptop until now. In fact, it's not something we're used to seeing on 11-inch machines, period. As you'd expect, the screen looks absolutely brilliant in person, not just due to its pixel density, but because its colors look almost as vibrant from near-180-degree angles as they do head-on. Additionally, the screen will come with an active digitizer for pressure-sensitive pen input.

The chassis itself will measure less than 15mm thick in its final form, and weigh in at less than 2.5 pounds. Regardless of what the final dimensions are, the XPS 11 doesn't tread much new ground in terms of design: it has the same attractive carbon fiber weave already used on the XPS 12 and XPS 13. Certain luxury details, like the metal plate on back covering the FCC info, have also made a return.

There is one area where Dell's taken a gamble, and that's the keyboard. For the XPS 11, the company went with a flat, Surface-style keyboard with no travel. Unlike the Surface, to be fair, the keys will give some feedback — audio feedback, mainly, though we felt some haptic sensations too when we tapped it. After all, this was a prototype unit we handled and we were explicitly forbidden from playing with the keyboard, in particular. We're intensely curious about what it's like to type on a keyboard like this, particularly when the machine in question is powerful and expensive enough to be one's primary computer.

ASUS MEMO PAD HD 7

Click on product names to read full stories

Joining ASUS' MeMo Pad family are a couple of self-explanatory models: the MeMo Pad HD 7 and the MeMo Pad FHD 10. While we've already gotten to test out the 10-inch model, this is the first we've seen of the 7-incher. Like the current Nexus 7, which this is going to replace, it has a 1,280 x 800 screen. With this new generation, though, it adds 5-megapixel and 1.2-megapixel cameras, SonicMaster audio and an ARM Cortex-A7 quad-core CPU. Oh, and it adds a microSD slot and a micro-USB socket, two things the Nexus 7 doesn't have. Unlike a Nexus product, the OS is the slightly older Android 4.0.

The big news here, however, is the price. As Chairman Jonney Shih said during its reveal, we needed our cameras, because it'll arrive priced at a pretty incredible $149 for 16GB and $129 for 8GB that's aimed at emerging markets.

In our brief hands-on, we quickly noticed the Memo Pad HD 7 has a glossy finish, which is a stark departure from the rubbery texture of the Nexus 7. It'll be available in four colors: black (naturally), white, pink and yellow. Even under the glare of the spotlights here at ASUS' press event, the 7-inch, 1,280 x 800 IPS screen remained easy to read, even at off angles. The quad-core A7 CPU also seemed up to the task of launching apps and keeping up with brisk OS navigation, though a true apples-to-apples comparison won't be possible until we actually get one in to review.

PRICE: $129-$149

AVAILABILITY: TBD

THE BREAKDOWN: ASUS' NEXT 7-INCH TABLET WIELDS A SUPER-LOW PRICE TAG, BUT RUNS AN OLDER VERSION OF ANDROID.

ACER LIQUID S1

PRICE: €329 ($427)
AVAILABILITY: Q3 2013
THE BREAKDOWN: ACER'S FIRST FORAY ABOVE FIVE INCHES HOUSES A NEAR-STOCK ANDROID EXPERIENCE, BUT LACKS LTE CONNECTIVITY.

Click on product names to read full stories

Acer kept the product announcements coming here at Computex, adding a new (and big) Android phone to its new Ultrabooks and Windows tablets. The Liquid S1 arrives with a 720p, 5.7-inch display, matching ZTE's Grand Memo in screen size, and marking Acer's first contribution to the five-inches-and-over smartphone club. The phone is bound for Asia and Europe, and it comes appropriately equipped with twin SIM-card slots. There are, however, no LTE radios, something that Acer admits will be arriving in its smaller Android devices first.

Other notable specs include a MediaTek quad-core 1.5GHz processor and 1GB of memory to aid Android 4.2. It's worth noting that the UI here, like we've seen from Acer in recent years, is largely a stock one, both in functionality and looks. In fact, the offscreen soft buttons are even assigned the same way: back, home and multitask. However, hold down on that multitask button and a pop-up window offers several shortcuts to app windows. It all falls somewhere between Sony's mini-apps and Samsung's Multi Window feature.

The Liquid S1's TFT display was serviceable enough during our hands-on time, although we'd have appreciated a little more brightness. Viewing angles are merely okay, and perhaps predictably do not compare to the smartphone world's current champions. Acer promises that the phone will last through a day of use on its 2,400mAh battery, and the pack is at least replaceable. There's also 8GB of storage that can be expanded by up to 32GB through microSD, while the whole device felt relatively light in our hand. It weighs 195g, making it just 15 grams heavier than the smaller-screened Galaxy Note II. The back of the phone is covered in a pleasant matte black plastic which means it's relatively easy to keep hold of despite its size. Likewise, contoured aluminum grips along the sides also help in that regard. D

Online Sharing: The New Global Zeitgeist

Mary Meeker's Internet Report is often considered a technology bellwether, and it's certainly living up to that reputation in the 2013 study. This year, the dominating trend is sharing: Meeker has noticed that many more of us are willing to publish our media and location data. People worldwide now share over 500 million photos a day through services like Facebook and Snapchat, while Dropcam, SoundCloud, YouTube and Waze are also growing. Americans aren't leading the trend, however. An estimated 15 percent of US internet users frequently share content online, while the world average is 24 percent. —*Jon Fingas*

PERCENT SURVEYED THAT SAY THEY SHARE "EVERYTHING" OR "MOST THINGS" ONLINE

JAPAN	4%
GERMANY	9%
HUNGARY	9%
SWEDEN	10%
FRANCE	11%
GREAT BRITAIN	11%
BELGIUM	13%
SPAIN	14%
CANADA	15%
UNITED STATES	15%
AUSTRALIA	17%
MEXICO	21%
RUSSIA	21%
ARGENTINA	23%
• WORLD AVERAGE	24% •
BRAZIL	24%
ITALY	25%
POLAND	30%
CHINA	33%
TURKEY	39%
SOUTH KOREA	40%
INDONESIA	50%
INDIA	53%
SAUDI ARABIA	61%

SOURCE: KPCB / IPSOS OPEN THINKING EXCHANGE

RECOMMENDED READING

COURTESY OF GLOBAL FUTURE 2045 INTERNATIONAL CONGRESS

This Man Is Not a Cyborg. Yet.

By David Segal
The New York Times

Ahead of the upcoming Global Future 2045 Congress in NYC, *The New York Times'* David Segal profiles the conference's founder, 32-year-old multimillionaire Dmitry Itskov. That date in the name of the conference comes from the year Itskov hopes to realize his decidedly ambitious goal: to create a real-world robotic avatar that's able to store nothing less than the complete contents of a human brain. As Segal explains, that's cause for plenty of skepticism, but Itskov and his conference have nonetheless managed to attract the interest of individuals from the likes of Harvard, MIT and Berkeley. Itskov is also pushing ahead with more modest efforts today, including a robotic head created by Dr. David Hanson (and modeled on Itskov himself) that's set to be unveiled at the conference — one that's promised to be "the most expressive android head in history."

Click on headlines to read full stories

A Tweetable Feast
By Jared Keller
Aeon
Tweeting and taking Instagram photos of food may be a cause of derision for most, but Jared Keller suggests that we may be a bit too quick to dismiss it. In this essay for *Aeon*, he connects the practice to what he calls the "inherently social" nature of food, and to a history of talking about food on the internet that extends far back beyond our current social media.

Why Cling to the Past?
By Charles Ardai
Boing Boing
Stephen King has hardly been the anti-e-book sort — he's readily embraced Kindle Singles — but he's decided to eschew the option for his latest novel, *Joyland*, in favor of a paperback-only release. In this piece for *Boing Boing*, the publisher of the novel explains the reasoning behind the decision.

Online Classes Can Be Enlightening, Edifying, and Engaging — But They're Not College
By Maria Bustillos
The Verge
MOOCs — Massively Open Online Courses — are getting more attention than ever these days, but they're also a controversial subject, with many concerned about how readily they're being accepted as a substitute for actual classes. Here, Maria Bustillos examines how one MOOC measures up, finding it worthwhile and informative, but not a replacement for a traditional college class.

PNDs TRY TO FIND THEIR WAY

BY ROSS RUBIN

FROM PITCH PIPES to voice recorders, the list of standalone devices that an unadorned smartphone can substitute for runs long. But the portable electronics products that smartphones have had the most impact on have been digital cameras / camcorders, portable media players and portable navigation devices (PNDs, although the Europeans did a better naming job with "sat navs").

The future of PNDs looked rosier in the days when cellphone navigation services required a monthly fee. Google Navigation changed all that and much of the market was relegated to sub-$100, Black Friday-bought glove compartment hermits. But even as they've released smartphone navigation apps, companies such as Garmin and Magellan keep plugging away at the PND, trying to differentiate from the smartphone apps while cooperating with them.

One example of this competition with the smartphone lies in the top two tiers of the Garmin nuvi line that include a feature called Real Directions, which Garmin collaborated on with Nokia. Providing a more human-like way of offering directions, the device will tell you to make a right turn "at the Mobil station" or some other real-world presence instead of just the number of miles or feet. Real Directions tends to kick in more on local streets than highways, where features like lane assist — less common in smartphone apps — come in handy.

It also features voice commands that make many common tasks such as finding an address or going home simple, convenient and safer. The nuvi line has

“The future of PNDs looked rosier in the days when cellphone navigation services required a monthly fee.”

always stood for thin and light designs, and at least the Prestige model is featherweight enough to work well with a slick and fast-holding magnetic inductive mount that can be attached to either a 12-volt interface or a standard USB connector. The mount makes it easier to remove the device for text input and reattach it for navigation.

At $100 less than the top-of-the-line Garmin, the chunky, large-bezeled slab embodying the Magellan SmartGPS doesn’t strike as impressive a profile and its mount isn’t as high-tech. Rather, the big picture of what Magellan’s been up to is building its own cloud service called MiCloud that shares navigation data among the screens that you have been using. And in this particular unit, the main navigation display shares real estate by default with Live Tile-like Yelp and Foursquare info squares for places of potential interest that are updated as you get closer to them.

It’s helpful to have this information pushed to you rather than having to query it, but the whole system would greatly benefit from voice control instead of the soft “dial” control at the top of the Magellan user interface. In fact, being able to have it spoken back from a prompt would be even more ideal in place of sacrificing navigation screen real estate. Failing that, the dial should be a physical control; right now the only button on the device’s face is a capacitive home button on the top-left corner of the display.

As with the TV, where there are also distance-related usage constraints (although with very different contexts), the smartphone can make for a better research and input tool than a PND. As such, both the Magellan and Garmin units have companion smartphone apps that can send addresses to their PNDs via Bluetooth or, in the case of the Magellan, through the cloud. But the cost of focused effort in getting from Point A to Point B can be significant. The top-of-the-line Garmin sells for $349. At that price, it will do little to sway the average user of free and integrated navigation apps to adopt a dedicated device. For those who are willing to invest in them, though, high-end PNDs can offer a more connected and relevant navigation experience than ever before. D

SO WHAT'S NEXT?

DISTRO
06.07.13

FORUM

THIS IS THE MODEM WORLD

BY JOSHUA FRUHLINGER

I JUST SPENT a week in Japan, where I attended my first Japanese wedding in Tokyo. It was lovely, different and the same all at once. I've been coming here almost annually since 1998, and while most things have remained the same, I've watched Japan's pace of consumer technology innovation take a seeming nosedive in recent years. I have no solid evidence to prove this — just some observations.

When I first visited Tokyo in 1998, Japanese mobile phones were years ahead of their American and European equivalents. Japanese mobiles were lightweight, had high-resolution — for the time — color screens, allowed internet access and some even had video cameras that supported real-time video chat.

The 1998 American version of a mobile phone was a heavy, black-and-white candy bar that was slow, ugly and did little more than make phone calls and send text messages. Nokias played *Snake*, which was awesome, of course. But that was about it.

I was amazed by the advanced, lightweight Japanese mobile phones. I bought one knowing it wouldn't work in the States, but was happy to return home and show the device to friends as if I had come from the future. I discovered loads of other new wonders as I trolled the streets of Tokyo and Osaka. I found a Game Boy cartridge filled with 900 games. I found roll-up silicone keyboards that were — at least at the time — mind-bendingly cool. Even humidifiers were the stuff of electronic wizardry.

But last week in Japan, everything seemed… the same. Mobile phones look just like our smartphones and in many cases they do even less than the American counterparts. Laptops and tablets even

“The early days of automotive design must have been exciting yet frustrating, just like the ‘90s were for mobile phones. Some cars looked amazing, but were mechanical disasters.”

look dated, and Apple products — as Apple products always are — look exactly the same, which isn’t terribly exciting. Has Tokyo slowed down tech-wise or has Silicon Valley sped up? Or am I just jaded? Or have we reached a vanishing point into which our gadgets are all becoming one?

The early days of automotive design must have been exciting and yet frustrating, just like the ‘90s were for mobile phones. Some cars looked amazing, but were mechanical disasters. Others ran forever, but looked like appliances. The pattern for cars may foretell the future of mobile phone design: America went nuts in the ‘50s and ‘60s and inspired the world. Then in the ‘70s and ‘80s, Japan pushed things forward by making cars both reliable and interesting at the same time. And then in the ‘90s, cars all morphed into the same, inline-four blah-mobiles that most of us drive today. Sure, there are standouts, but you’ll pay for it.

I remember the moment I realized that the world had caught up to Japan: As I looked around car number 3 on the Yamanote Line, I saw a sea of white touchscreen smartphones just like the ones I saw back in New York and Los Angeles. Like cars, our personal technology is starting to blend into one best-practice design that, also like cars, will be more efficient and do what we need it to do, all at the expense of intrigue.

Only time will tell if this is a good thing. Perhaps we’re just arriving at the final stages of personal technology’s industrial design and we’ll focus on software as the competitive sphere. Maybe we’re already there, what with new mobile operating systems being announced on a quarterly basis and companies sprouting up and withering away just to cash in on mobile software development.

Or maybe there’s more to be done: voice and gesture input, heads-up displays, predictive hands-free technologies… the list could go on. Maybe I’m just bummed that Tokyo gave up on that snappy lightweight flip design from the future and gave in to the slate touchscreen thing.

The most likely explanation, though, is that Japan was so far ahead of us in the ‘80s and ‘90s that it was inevitable that we’d catch up and consumer electronics would find another hotbed of innovation. And perhaps now that those innovations are less foreign, they’re less exciting. D

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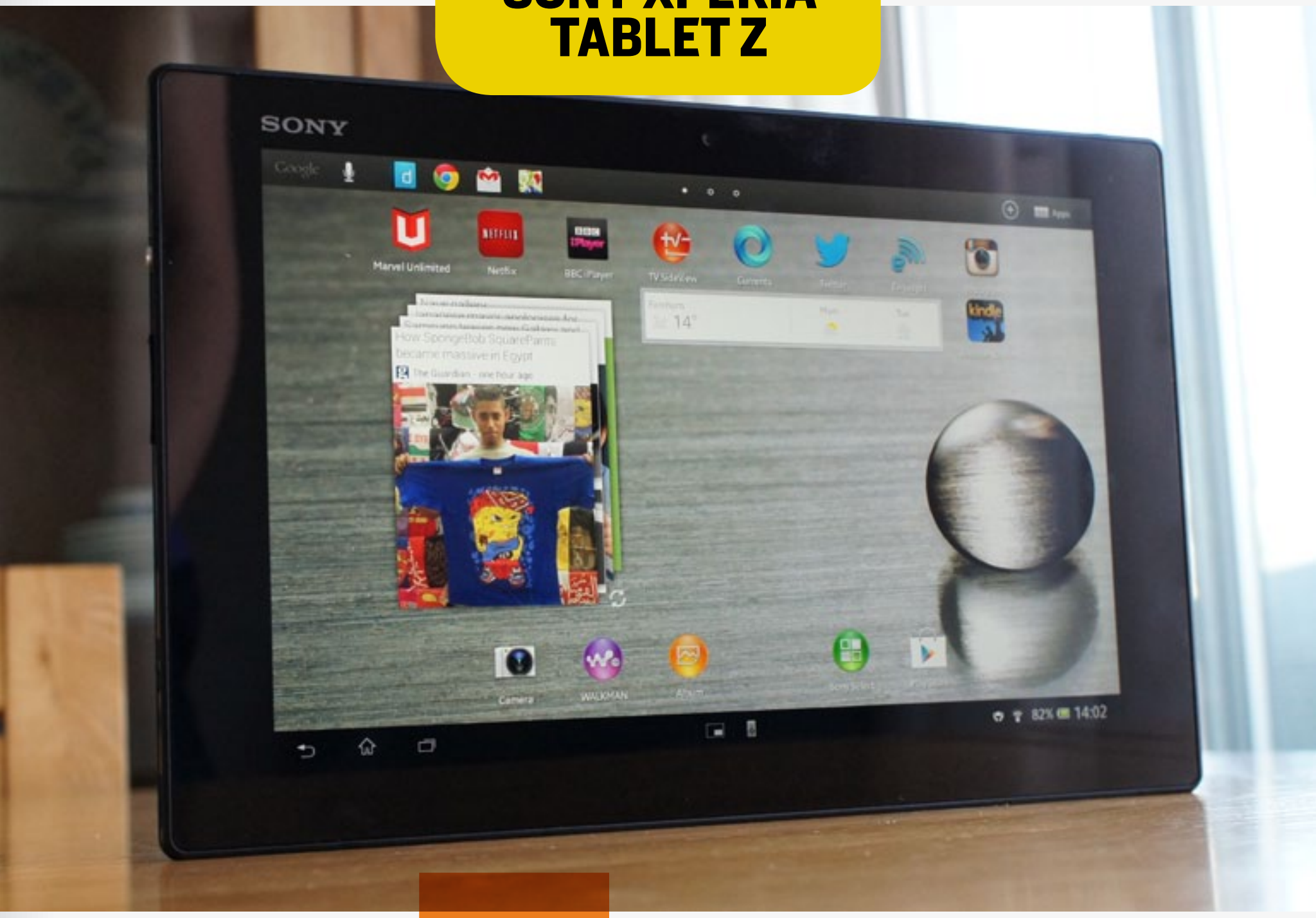
SONY XPERIA TABLET Z



The Tablet Z is the new jewel in the Xperia crown, but will the 1080p display and water-resistant features be enough of a draw in today's tablet market?

By Mat Smith

It wasn't all that long ago that every month offered up yet another Android tablet for review. While Samsung is still producing plenty, the output of Google-powered slabs has generally slowed, replaced by a steady stream of Windows 8 / RT hardware often from the very same manufacturers that were once all about Android. Sony continues to be pretty discriminating with its launches, however: until now it's released only three Google-powered tablets. The first was the Tablet S, followed by the clamshell Tablet P and the Xperia Tablet S, which improved on the orig-

inal with a thinner build and improved specifications.

Then there's this, the Xperia Tablet Z. It arrives with a completely new design, although it should be familiar to anyone who's already seen Sony's Xperia Z smartphone. It features the same "OmniBalance" look, uniform thickness and straight edges. The display's resolution has been bumped up to 1,920 x 1,200, while the tablet runs Android 4.1.2 on a quad-core 1.5GHz Snapdragon S4 Pro, with 2GB of RAM and 16GB of built-in storage — all while weighing in below 18 ounces (1.13 pounds). Like the Xperia Z smartphone, there's also water and dust protection, which makes it a relatively unique property in the tablet market. But priced at $499 and up against the iPad and the pin-sharp Nexus 10, is there enough here to protect itself against the tablet competition?

We feared the tablet would be a little uncomfortable with those sheer corners and razor-thin 6.9mm profile, but the lightness ensures that it's perfectly comfortable to hold in both landscape and portrait.

The Tablet Z cribs its style from the Xperia Z smartphone.

HARDWARE

Sony is hitting its stride with its Xperia hardware design. While we initially feared the Xperia Tablet Z would prove uncomfortable with those sheer

corners and razor-thin 6.9mm profile, the lightness actually ensures that it's perfectly comfortable to hold in both landscape and portrait. Each of the edges is coated in the same glossy black plastic as the front of the tablet, while the back goes for a matte finish — one that gave a bit of grip for our fingertips to hold on to.

Aside from some Xperia branding in the center, and a symbol to represent the device's NFC credentials, there's only an 8.1-megapixel camera to break up the back, located in the top-right corner. The secondary, front-facing 2.2-megapixel camera is centered above the screen and both use Sony's Exmor R sensors — marked improvements over Sony's previous tablets.

Another upgrade from its Android tablet predecessors is the display. It may have the same 10.1-inch size, but it's now capable of 1080p playback. The official resolution (1,920 x 1,200) affords a little extra space for the on-screen Android soft keys. There's a pretty substantial inch-wide bezel around the display, but this enables you to hold on to the tablet without inadvertently nudging the touchscreen. In fact, from the front, at least, it bears a passing resemblance to BlackBerry's PlayBook.

There are also stereo speakers split across both of the lower corners, so the four outlets are almost exactly where your palms will cup the device. If you're worried that would affect audio playback, you'd be right, although the unfortunately tinny, treble-heavy playback means music actually sounded *better* with our hands filtering it. Maybe we've been spoiled by the mobile audio skills of the HTC One, but on a tablet, we had hoped for a lot better.

Despite its claim to be the world's thinnest and lightest tablet, the Z is still surprisingly solid. We're relieved to say that Sony has improved on the early preview models we toyed with at MWC, nixing an awkward creak we found while handling it. Additionally, the company's engineering team fixed a screen that

A water-blocking cover hides the Z's audio jack.

Despite its claim to be the world's thinnest and lightest tablet, the Z is still surprisingly solid.

previously looked distorted if you applied pressure to the display. Suffice to say, we experienced neither of those issues with our retail sample.

Even with the slim silhouette, the Xperia Tablet Z still manages to house everything you'd expect in a 2013 Android tablet. Alongside 16GB of storage, there's memory expansion through microSD, FM radio, Bluetooth 4.0, WiFi, an infrared blaster and HDMI through an MHL-compatible micro-USB port. That blaster, which resides along the center of the top edge, means the tablet can double up as a multi-talented remote.

Along the left edge, there's a port for headphones (with a water-protective cover), volume rocker and Sony's talismanic power button. It's still machined aluminum, although it wobbles around a little more than it does on the related smartphones. There's also a notification light that resides here, which will broadcast whether your tablet is charging or when there are new emails and other social notables. If you prefer to avoid blinking lights, you can also turn it off inside the Display tab of the Settings menu. There are two more protective cover flaps for microSD and micro-USB along the bottom side and these covers are identical to the ones found on the Xperia Z. While sturdy enough, we do have concerns with their longevity — they're a necessity for the water and dust resistance. In our not-so-scientific testing, the IPX5/7-qualified tablet held up fine against our hose-down and a few dunks into a nearby sink. We just have to reiterate — check that you've closed all those port covers.

DISPLAY

Sony's new tablet display might not be the highest resolution we've seen, but it's perfectly suited for 1080p video playback, swiping through photos and browsing the internet. This pixel count places it squarely between the 1,280 x 800 Galaxy Note 10.1 and the 2,560 x 1,600 Nexus 10, both from Samsung. Having spent plenty of time with the iPad's differently proportioned screen, we reckon the Tablet Z's widescreen ratio is the better option in many scenarios. As well as acting as a more suitable canvas for movies, internet browsing while in vertical orientation offers a lot more scroll room — useful for news sites with ever-updating content.

Sony's thinned its tablet screen tech, removing a layer of air to keep the touch panel closer to the surface while reducing reflection. This is also what ensures the screen remains black (and almost the same shade as the tablet) when switched off. Size aside, the panel appears to be a different caliber to the

SONY XPERIA TABLET Z

The new display rocks a 1,920 x 1,200 resolution.

one found in the Xperia Z smartphone, with a high level of off-angle visibility and little to no color undulation either — two major complaints we had with Sony's smartphone flagship. However, we tended to crank up the brightness setting to the higher levels while in use. A layer of tempered glass, while perhaps not our preferred choice, didn't pick up a scratch during our week of testing.

CAMERA

We'll keep it brief here. Tablets are rarely gifted with the greatest camera sensors because, well, they're tablets. Sony at least went so far as to include one of its Exmor R 8-megapixel camera units, but performance is still average. We were a little disappointed with the noise on several shots, perhaps, in part, because faults are more easily visible on a screen with the resolution to show you the whole shot. There's no flash to assist in darker settings, but automatic white balance does a decent job of ensuring colors look correct, while Sony's customizable camera app UI is easy to configure with the settings you need.

Video capture is also a bit underwhelming, with typically overexposed skies and a scrolling effect kicking in

Auto white balance did help colors a bit in darker shots.

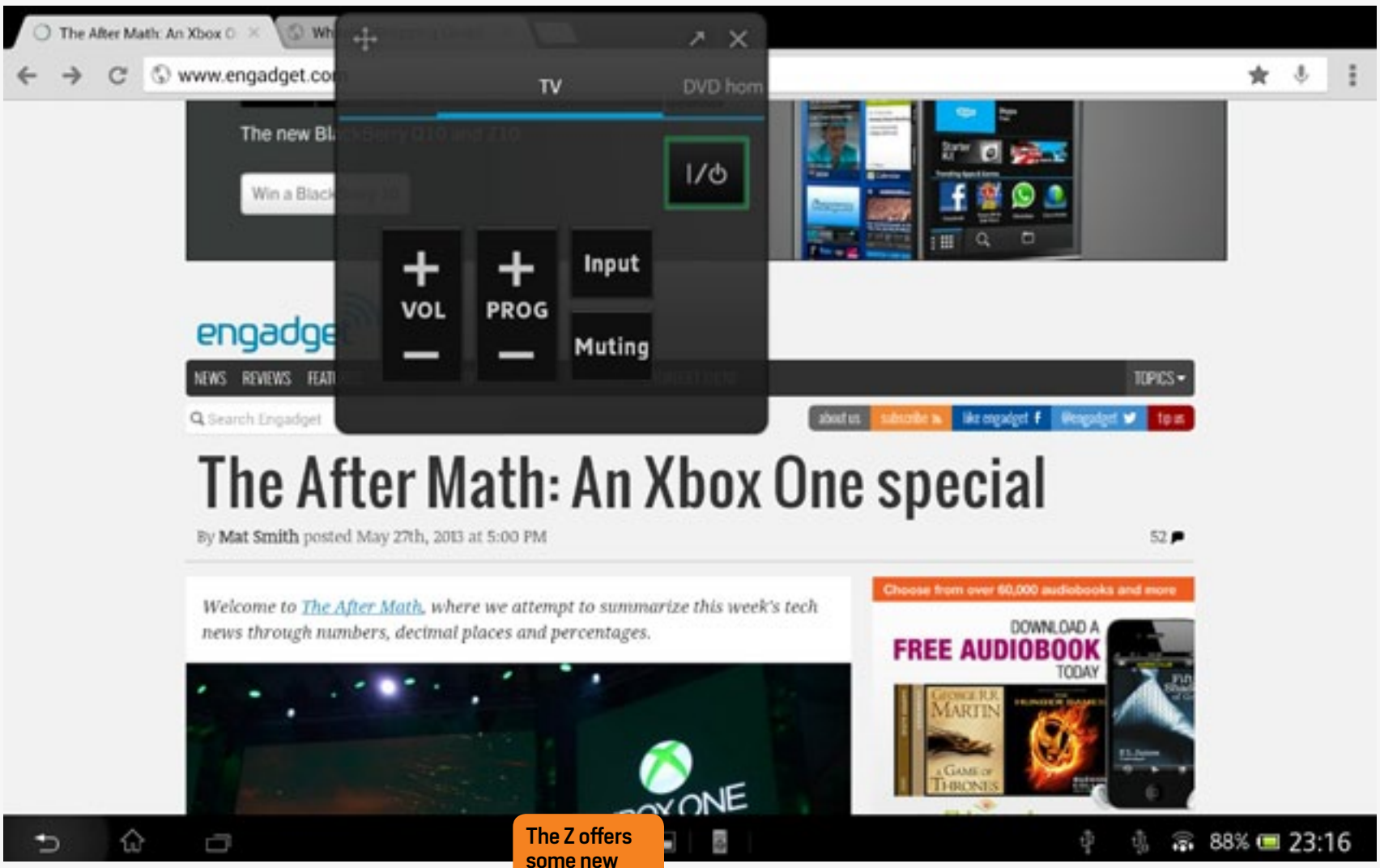
when on-camera action went over a certain level. These results were very similar to what we'd get from a smartphone from two years ago, so it's very likely we're dealing with the same sensors here. Though HDR video capture didn't make the cut on the tablet, you still get an option for HDR stills. One final niggle is the unfortunate top-corner positioning of the lens, which seemed to constantly pick up smudges.

SOFTWARE

To its credit, Sony didn't go overboard with the software bloat — or at least what's there is easy enough to erase. There's a predictable row of movie, music and gaming icons, including shortcuts to your own content and Sony's entertainment network. We're starting to sound like a broken record, but we're still sticking with our iTunes account and Netflix subscription. Sony needs to work on making its entertainment hubs more appealing — a lengthy free trial to go alongside your $499 tablet purchase might help.

A familiar combination of light-trail wallpapers, widgets and coolly styled menus make Sony's Android skin relatively inoffensive. The bare bones of the UI are almost identical to what we saw on last year's Xperia Tablet S, with two icons along the lower edge of the screen that act as shortcuts to both the remote and mini-apps (more on those soon). There are also extra slots along the top edge for your four favorite apps. These stay put as you navigate around home screens and apps, and so are good places to keep

A familiar combination of light-trail wallpapers, widgets and coolly styled menus make Sony's Android skin relatively inoffensive.



The Z offers some new mini-apps including an IR blaster.

your browser, email and other regular-use shortcuts. Notifications and settings reside in the lower-right corner, while your app tray shortcut lies above that in the top-right corner — it's a little different from the uncomplicated perimeter of stock Android on the Nexus 10.

As we've seen already on other recent Xperia devices, you'll be able to access a collection of mini-apps that can be floated above other apps. It's not quite as functional as the multi-window mode seen on Samsung's Galaxy series; you won't be able to split the screen between video or map apps, for example. These mini-apps are more focused towards utility, but there's the notable addition of a floating web browser window, alongside duller fare like a timer and calculator. There's also a mini-app for the remote, which, we have to admit, offered us the smoothest pairing method we've ever seen on an Android device with an IR blaster. After choosing our product category and manufacturer (yep, it's not Sony-exclusive), we were able to pair several TVs, a sound system and a Blu-ray player within minutes. There's also the option to customize which control buttons show up within the app, and a "trackpad" option that lets you assign four specific controls (like volume and channel buttons) to swipes.

Curiously, SideView, a Sony app that pairs a TV guide with remote control and voice search, wasn't pre-loaded on our

European model. We went ahead and installed it for ourselves from Google Play, and it happily pulled down a program guide for terrestrial UK TV networks. The app adds some extra show details from Gracenote, although without a Sony-based TV to link to, we weren't able to swipe our program choices from the tablet to the big screen as we hinted at in our preview. If you're looking to share your own video content, or the likes of Netflix and Amazon Prime, an MHL-compatible micro-USB port will let you beam your tablet's HD display to the big screen with minimum fuss.

PERFORMANCE AND BATTERY LIFE

The Tablet S' sluggish behavior was one of the major issues we had with the folded-design tablet, a performance that was best described as erratic. Fortunately, the Tablet Z behaves like we hoped it would: a quad-core 1.5GHz Snapdragon S4 Pro paired with 2GB of

Pitted against the Nexus 10 (with a dual-core 1.7GHz A15 processor) and the Note 10.1 (with a quad-core 1.4GHz Exynos 4) Sony's tablet comes off looking very strong.

RAM is more than enough for most of our Android tasks, regardless of Sony's Android skin atop Android 4.1.2. The screen responded to our touch immediately, while apps launched briskly. If we had one niggle, it's that we experienced unwarranted resets twice during our time with the tablet, but these were both when we first received the Xperia Tablet Z — it soon settled with use.

BENCHMARK	XPERIA TABLET Z	NEXUS 10	SAMSUNG GALAXY NOTE 10.1
QUADRANT	**7,434**	4,551	5,695
VELLAMO	2,242	1,605	**2,395**
ANTUTU	**20,263**	8,731	11,962
SUNSPIDER 1.0 (MS)	1,382	1,501	**1,233**
GLBENCHMARK 2.5 EGYPT OFFSCREEN (FPS)	32	**33**	N/A
CF-BENCH	**17,790**	9,772	13,157

SUNSPIDER: LOWER SCORES ARE BETTER

TABLETS	BATTERY LIFE
SONY XPERIA TABLET Z	8:40
APPLE iPAD MINI	12:43 (WIFI)
SAMSUNG GALAXY TAB 7.7	12:01
APPLE iPAD (LATE 2012)	11:08 (WIFI)
APPLE iPAD 2	10:26
ASUS EEE PAD TRANSFORMER PRIME	10:17
SAMSUNG GALAXY TAB 10.1	9:55
APPLE iPAD (2012)	9:52 (HSPA) / 9:37 (LTE)
GOOGLE NEXUS 7	9:49
MICROSOFT SURFACE FOR WINDOWS RT	9:36
APPLE iPAD	9:33
ASUS TRANSFORMER PRIME INFINITY TF700	9:25
PANTECH ELEMENT	9:00
MOTOROLA XOOM 2	8:57
HP TOUCHPAD	8:33
SONY XPERIA TABLET S	8:31
LENOVO IDEAPAD K1	8:20
MOTOROLA XOOM	8:20
T-MOBILE G-SLATE	8:18
ACER ICONIA TAB A200	8:16
SAMSUNG GALAXY TAB 7.0 PLUS	8:09
GALAXY NOTE 10.1	8:00
LENOVO THINKPAD TABLET	8:00
GOOGLE NEXUS 10	7:26

Pitted against the Nexus 10 (with a dual-core 1.7GHz A15 processor) and the Note 10.1 (with a quad-core 1.4GHz Exynos 4) Sony's tablet comes off looking very strong, besting the other two 10-inchers with ease across our metrics. The AnTuTu test score, which surveys memory performance, SD card-writing speed and 3D performance among other things, is notably higher on the Xperia Tablet Z, while SunSpider results showed the Xperia tablet bested on browser performance by the similarly quad-core Note 10.1. The Sony tablet, however, otherwise trounces its Android competition in the rest of our benchmark tests on a Qualcomm chipset we're more used to seeing in smartphones.

With a 6,000mAh battery, the Z may match the Xperia Tablet S that came before, but this time it needs to power a far more pixel-dense display. Fortunately, in our standard rundown test (50 percent brightness, WiFi on, video looping), we got a respectable eight hours and 40 minutes — slightly better than Sony's last tablet (8:31). In more normal use, we found the tablet lasted through a day of moderate use, although we'd advise taking a charger with you if you're going to rely on it for a full day. Daily charging was the norm.

The Xperia Tablet Z comes boxed with a charging adapter that appears to be identical to a smartphone charger. But here it's supporting a device that both outputs more energy and boasts a higher-capacity battery, meaning you'll need to

plug it in overnight to get a full charge. Sony's official Japanese press release pegs it at six hours and 30 minutes and our tests came to a similar figure. Worse, we found the micro-USB charging port to be a little temperamental. Attempting to charge the tablet from empty overnight, we woke up twice to a still completely discharged device, which is a concern.

WRAP-UP

Sony's made its best tablet yet. It's a stylish relaunch of the company's Android tablet series, but we can't shake the feeling that the Xperia Tablet Z's benefits are harder to sell than, say, the crisp display resolution of the Nexus 10 or the app strength of the iPad. Features like NFC and the infrared blaster ensure it lives up to its promise as a TV companion, while the screen is capable enough to share among friends or prop up for an impromptu TV-watching session. Once installed, Sony's SideView TV app and remote control mini-app offer up one of the easiest second-screen combinations we've ever used.

However, while the unlikely combination of the Xperia Tablet Z's unassuming design and water protection is impressive, there simply aren't that many water hazards in the living room and coffee shops. It's the kind of feature that a smartphone needs far more than a tablet. All that said, this remains a premium Android tablet with a lightweight, but solid build. It's just that it also has a premium price — one we're not sure it can command. D

Edgar Alvarez contributed to this report.

Mat is an Associate European Editor who lives in the UK. He's a Liverpool supporter who enjoys obscure Japanese game shows.

BOTTOMLINE

SONY XPERIA TABLET Z

$499 (16GB)

PROS

- 1080p display offers good viewing angles
- Infrared blaster and remote apps easy to set up
- Water-resistant, stylish design

CONS

- Weedy charger, temperamental micro-USB port
- Frustrating waterproof covers
- Specs aren't high-end enough, given the price

BOTTOMLINE

The Xperia Tablet Z serves as an excellent second screen. Remote function is easy to set up, while the display is one the best we've seen from Sony's Xperia range, if not the market in total.

REVIEW

MSI GT70 DRAGON EDITION 2

The GT70 Dragon Edition 2 builds on an already successful legacy by adding a fresh new Haswell CPU and stellar battery life

By Sean Buckley

One of the strongest gaming laptops of 2012 had to be the MSI GT70. Like all machines of its type, it was huge, oversized and ridiculously heavy — but it trumped many of the category's biggest faults by being superbly crafted, surprisingly long-lasting and by boasting the bleeding edge of tech: an Ivy Bridge CPU. It was a darn good machine, so it's no surprise that MSI is hoping for a repeat performance. Meet the GT70 Dragon Edition 2: a Haswell-toting, 17-inch gaming laptop with all the trappings of its predecessor. It may be the second GT70 to adopt

the Dragon moniker, but it's the first to pack Intel's fourth-generation Core processors. NVIDIA's latest mobile GPU is here too, not to mention notable OS upgrades, port tweaks and a mystical new motif. Let's dive in and see if MSI's encore deserves a standing ovation.

LOOK AND FEEL

It's hard to avoid comparisons to MSI's original GT70 while handling the Dragon Edition 2 — after all, the two machines are built on the same chassis. The Dragon 2's 8.6-pound, 16.85 x 11.34 x 2.17-inch frame is a dead ringer for its predecessor, differentiating itself with only a handful of tweaks and a new color scheme. An aggressive red streak bleeds through the machine's brushed-aluminum palm rest and lid, decorated with a stylized dragon tattoo. This separates the revision from its plainly designed predecessor, and obviously demands a little more attention. "I am a hardcore gaming machine," it declares. Subtle it's not, but it isn't incredibly loud either; it finds a nice middle ground where all that flair is just noticeable enough to make clear this is a special edition machine.

Visually, little else has changed since the previous generation. Peer along the frame's edges and you'll notice it mirrors the original GT70 exactly: three USB 3.0 ports, an SD card reader and four audio jacks for line-in, line-out, a microphone and headphones on the left and a pair of lesser USB 2.0 ports and an optical drive on the right. The laptop's rear rounds out its connectivity options with an AC plug, VGA and an HDMI port. A Mini DisplayPort stands out as the only change, replacing the original's eSATA socket.

> This says, "I am a hardcore gaming machine."

Crowding the edge of the laptop's hinge are a touch-sensitive control bar and a physical power button. This layout, too, is mostly identical to the standard GT70's quick buttons, offering screen and brightness controls, a WiFi toggle and

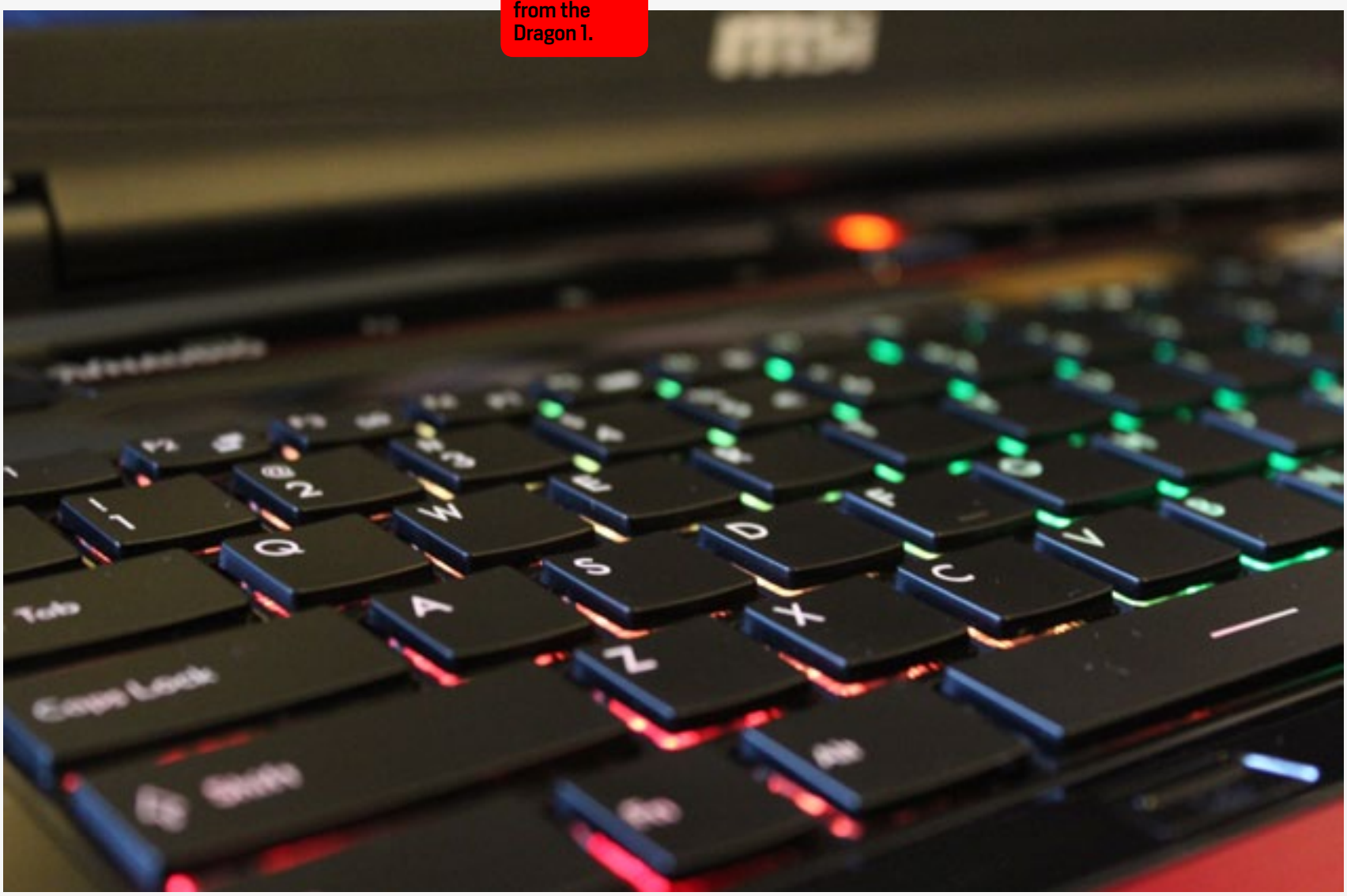
This laptop is a hefty, 8.6-pound gaming beast.

a shortcut to a system control manager offering many of the same functions. The previous model's fan-accelerating "cooler boost" mode is here as well, but its one-touch, overclocking "Turbo" mode has been perplexingly replaced by a media button. Maybe MSI figured that NVIDIA's GeForce GTX 780M wouldn't need the extra help. More on that later.

KEYBOARD AND TRACKPAD

The GT70's chiclet keyboard glows with a rainbow of LED lights, softly illuminating the keycaps with a subtle dash of color. There's nothing new here, and that's fine — this SteelSeries arrangement is still one of the better island-style keyboards we've seen on a gaming machine, offering light keycaps that depress with a soft, but audible click. It's still a far cry from the mechanical setups many desktop gamers are accustomed to, but for a portable rig it's more than satisfying. Still, competitive gamers who demand full anti-ghosting will need to look elsewhere — like most gaming laptops, the GT70 can only bear between six and eight simultaneous key presses. Anyone not in that minority, however, will be hard-pressed to complain.

Oddly, the keyboard's most significant fault comes from the computer's operating system, not its hardware build. We normally applaud the absence of a left-hand Windows key on a gaming rig (all



The quality keyboard is carried over from the Dragon 1.

the better to avoid accidental quits with), but proper desktop utilization of Windows 8 often means using hotkeys. Users accustomed to tapping Win+D with their left pinky will have to retrain themselves — this keyboard's only Windows key lives on its starboard side.

Considering how central the mouse is to the desktop computing experience, it's shocking how many laptops hit the market with downright terrible trackpads. Thankfully, the Dragon 2 takes yet another tip from the original GT70, retaining all the laudable qualities of its predecessor's superb mouser. The pad's buttons sink in with a satisfying click and its large matte surface feels smooth under a lazy finger. It doesn't even stumble over Windows' gesture system — when a trackpad does just about everything right, there's not much to talk about.

Unfortunately, the pad does have one fatal flaw: it's on a gaming laptop. This wouldn't normally be a problem, but for whatever reason, this particular touchpad refuses to read input while the keyboard is in use. This quickly becomes a problem for gamers who are too lazy to plug in an external mouse. Laptop trackpads have never been an ideal game-control device, but they should *always* be an option. Sadly, this one isn't.

DISPLAY AND SOUND

The bulk of an oversized gaming laptop doesn't truly dawn on you until you've pried open its lid and gawked at the gargantuan proportions of the rig's 17-inch display. What seemed tiny on your desktop PC is now daunting, enormous and, if you're very lucky, gorgeous. The Dragon 2's 1,920 x 1,080 LED panel takes a decent stab at the latter qualifier, but doesn't quite stick the landing. While the display flaunts well-balanced colors and sharp visuals, it suffers from notably shallow vertical viewing angles. Horizontal angles, meanwhile, betray a slight, but tolerable loss of color. Still, looking at the screen head-on makes for a solid viewing experience, and its matte finish ensures that any time spent with it will be blissfully glare-free.

The Dragon 2 employs the same Dynaudio credentials MSI outfits most of its gaming rigs with, and it's clear why: the GT70 has some of the best audio we've heard on a gaming laptop. Loud, but without distortion, the Dragon 2's 2.1-channel speaker setup easily fills a room — and yes, that post-decimal digit is right: there's a subwoofer on the bottom. The hardware can't take all the credit, however — turning off the pre-installed Sound Blaster Cinema software instantly presents a muted experience that, while still decently loud, doesn't envelop the listener in quite the same way. Luckily, this software is enabled by default, ensuring just about anything you pipe through the laptop's speakers will sound pretty great. Gamers looking for a completely immersive audio experience will still need to employ a dedicated headset, but those

MSI GT70 DRAGON EDITION 2

This GT70 managed well over four hours of battery life.

without one shouldn't be at all disappointed by the rig's native speakers.

PERFORMANCE AND BATTERY LIFE

When consumers buy a 17-inch gaming behemoth for a laptop, battery life doesn't usually top their lists: *raw power* does. We were surprised to find, then, that the MSI GT70 Dragon Edition 2 has plenty of both. Not only did it run circles around most of the games we tested (more on that below), but it also survived Engadget's standard battery test for a staggering four and a half hours — by far the longest-lasting gaming rig of its size that we've ever tested. In a category where two hours is considered a good showing, more than four is simply unprecedented. Intel's latest chipset is probably the reason, making good on its promise to sip less wattage than Ivy Bridge. If Haswell can do this

When consumers buy a 17-inch gaming behemoth, battery life doesn't usually top their lists: *raw power* does. The Dragon Edition 2 has plenty of both.

BENCHMARK	PCMARK7	PCMARK VANTAGE	3DMARK06	3DMARK11	ATTO (TOP DISK SPEEDS)	BATTERY LIFE
MSI GT70 DRAGON EDITION 2 (2013) (2.4GHZ CORE i7-4700MQ, GEFORCE GTX 780M)	**6,111**	**20,250**	10,260	**E10,519 / P7,416**	**1.19 GB/S (READS); 806 MB/S (WRITES)**	**4:34**
MSI GT70 [2012] (2.3GHZ CORE i7-3610QM, GEFORCE GTX 670M)	N/A	14,073	18,955	N/A	N/A	2:49
RAZER BLADE 2.0 (2.20GHZ CORE i7-3632QM, GEFORCE GTX 660M)	N/A	17,120	15,876	N/A	N/A	3:29
RAZER EDGE PRO (1.9GHZ CORE i7-3517U, NVIDIA GT640M LE 2GB)	4,949	13,536	10,260	E2,507 / P1,576	409 MB/S (READS); 496 MB/S (WRITES)	3:40
SAMSUNG SERIES 7 GAMER (2.30GHZ CORE i7-3610QM, GEFORCE GTX 675M)	N/A	11,515	**21,131**	N/A	N/A	2:11

with a gaming laptop, we can't wait to see how far it'll stretch out a longevity-focused Ultrabook.

The Dragon 2 didn't sleep through its performance tests either, racking up scores of 20,250 and 6,111 in PCMark Vantage and PC Mark 7, respectively. Not surprising, considering the stuff it's made of. The MSI GT70 Dragon Edition 2's chassis houses a 2.4GHz Intel Core i7-4700MQ Haswell CPU, NVIDIA's new GeForce GTX 780M chipset (with 4GB of

GDDR5), 32GB of 1600MHz DDR3 RAM and three 128GB SSDs configured in Raid 0 with a 1TB HDD for extra storage. Suffice to say, this rig shrugged off our day-to-day workflow like it was idling. We found its storage configuration to be quite fast as well (with 1.19 GB/s read speeds and 806 MB/s write speeds in the ATTO disk benchmark), but MSI told us our review unit was actually *under*performing — it should be reading data at a rate of 1,500 MB/s. MSI says it's looking into the issue, and hopes to have a solution soon. Even so, we're not exactly scoffing at 1,200 MB/s. Not into benchmark scores? Here's a more practical look at how fast the drive is: a cold boot to the Windows 8 Start Screen took just a hair over nine seconds. Pretty darn quick.

The Dragon 2 just happens to be one of the first machines on the market with both Intel's fourth-generation Haswell processor at its heart *and* NVIDIA's new GTX 780M GPU — the chance to put the duo through their paces was simply irresistible. Our standard allotment of test games barely even phased the Dragon 2; *The Elder Scrolls V: Skyrim* chugged along at 75 frames per second in outdoor environments, jumping an extra 10 in dungeons, and *Call of Duty: Black Ops II* flirted with triple digits by flaunting a 92 fps average. Both titles were configured to their highest available settings. *Battlefield*

The matte 1,920 x 1,080 display is best viewed head-on.

3 managed an impressive 70 fps when tuned to ultra-high detail, followed closely by a PhysX-enabled *Batman: Arkham City* at 61 fps. *Grand Theft Auto IV*'s bustling city trailed behind with a respectable 40 fps average. Newer games didn't give the system pause either — *BioShock Infinite* averaged 56 frames per second on ultra-high quality and *FarCry 3* averaged about 45.

New silicon or not, we were determined to make the Dragon 2 stutter. Naturally, we loaded up *The Witcher 2* and *Crysis 3* — two games known for pushing gaming hardware to its limits. Tuned to their maximum visual settings, these titles *finally* gave the new GT70 something to groan about. *The Witcher 2* initially clocked a middling 25 fps, just under the 30-fps threshold that many gamers consider the bare minimum. *Crysis 3* fared even worse, falling in at 19 frames per second. Of course, these low frame rates didn't last long — switching off *The Witcher 2's* Ubersampling feature allowed the game to run at an impressive 55 frames per second on ultra-high quality with *Crysis 3* seeing similar speeds when tuned to medium. We were even able to eke a bit more out of *Crysis 3*, tweaking its settings to a comfortable high-fidelity middle ground that averaged about 40 fps. Disconnecting the machine from its AC adapter will cause it to fall back on its integrated Intel HD 4600 GPU, however. In a pinch, one could turn down game settings and get by, but don't expect the eye-melting wonders we cite above: we were lucky to break 25 fps in ultra configurations without NVIDIA's help.

The Dragon 2 is truly a beast, evidenced not only by its impressive performance, but also by the massive heat it's capable of generating. While most of the laptop stays at a comfortable medium-warm temperature during intense gaming, the area under its main left-side vent can get uncomfortably hot. Thankfully, it doesn't *have* to get that hot — the machine's aforementioned "cooler boost" mode keeps the area at a tolerable temperature, and is a must when gaming on one's lap. Make sure you plug in a pair of headphones, however, as the fan is excessively loud when switched into overdrive. The temperature control is worth the extra decibels, of course, but we couldn't stand leaving it on all the time.

SOFTWARE

A lot of gamers spend their first few hours with a PC unloading unwanted software — photo editors and media player trials from companies nobody's ever heard of, unwanted music suites and more. It's a bit of a hassle. While MSI does have a habit of loading its machines with excess programs, the situation seems to get better with every unit we see. The original GT70 packed an entire suite of multimedia-management bloatware, for instance, but the Dragon Edition 2 has the good form to keep these "freebies" to a minimum. Aside from the somewhat-standard

Norton Internet Security trial, almost everything on the machine is here for a good reason. MSI's system control manager app offers a one-stop shop for all the machine's basic settings, and its Keyboard LED Manager allows the user to customize the laptop's keyboard backlight color, as the name implies. There's a third-party network manager too, and those Sound Blaster audio tools — software packages that complement the laptop's hardware rather than weight it down.

Those of you with a favorite media player may have cause to ditch the Dragon 2's default, however — Cyberlink PowerDVD 10 spins Blu-ray discs well enough, but we had to update it before it would do so without freezing. It's also littered with advertisements for new films, so it's a bit of an eyesore during use. It does the job, but we would have preferred something with more subtlety.

The only notable addition to the new GT70's software lineup is Bluestacks, which allows users to run Android apps under Windows 8. The program is definitely very nifty, but its inclusion is almost puzzling: this particular version of Bluestacks was designed to make the most out of Windows 8 touch devices, and the GT70 Dragon Edition 2 *isn't one*. The Android version of *Angry Birds Space*, for instance, was extremely difficult to play because scrolling didn't quite work with the laptop's touchpad. In most cases, you're probably better off with the Windows 8 marketplace equivalent of your favorite Android app, but if that's not an option, Bluestacks is here.

CONFIGURATION OPTIONS AND THE COMPETITION

Taken on its own, the GT70 Dragon Edition 2 has no alternative configurations, offering only the complete package, a $2,800 machine

The setup includes top-notch 2.1-channel sound.

MSI GT70 DRAGON EDITION 2

with a 2.4GHz Intel Core i7-4700MQ CPU, NVIDIA GeForce GTX 780M graphics, 32GB of RAM, three 128GB SSDs in RAID 0 and a 1TB HDD. View it as the highest-tier option in MSI's full GT70 lineup, however, and suddenly you've got options. MSI offers 10 different configurations of its standard GT70 gaming rig, offering alternative builds on the same chassis priced anywhere from $1,499 to $2,800. These models are all fairly similar, differentiated only by slight clock speed variations (they all use the same Intel Core i7-3610QM CPU) and differences in RAM, disk space, optical reader and GPU. If you can hold out a *little* while, MSI tells us most of these machines will see upgrades of their own, including more memory, the Dragon 2's triple SSD Raid 0 configuration, updated GPUs (GTX 780M and 770M chips, specifically) and of

The Dragon Edition 2 is the top tier of GT70 options.

course, Intel's latest chipset.

If you're determined to have the latest and greatest hardware in your portable rig, but aren't into MSI's kit, you'll need to sit tight. Just like the original GT70, the Dragon 2 is the first serious gaming rig out of the gate with Intel's newest silicon — there simply aren't that many alternatives to choose from. If the Dragon isn't for you, we recommend waiting until real competitors arrive. If you simply *need* to get something now, take a look at Razer's 2012 Blade revision; it won't best the GT70 in benchmarks, but it'll at least offer a slimmer, more attractive chassis.

WRAP-UP

The MSI GT70 Dragon Edition 2 took almost everything we threw at it, chewed it up and came back for more. It stands as a solid example of a hardware refresh done right, keeping everything that made the original great while still tossing in enough improvements to keep buyers interested. For the most part, its faults include a few things MSI didn't fix from the previous version: a stellar screen that suffers from poor viewing angles and a loud fan. If its trackpad didn't have a gameplay-inhibiting glitch, we'd be hard-pressed to find anything that its predecessor does better than the Dragon 2. It's a worthy upgrade for gamers who can bear its lofty $2,800 price tag, packing enough oomph to keep its owners playing new titles for at least a few years to come. Bottom line? The GT70 is *still* one of our favorite gaming laptops on the market today, and it's now much better for its Haswell internals. D

Sean is a lifelong gamer, a comic-book nerd, and an Eagle Boy Scout. He also writes for Engadget. What else is there to know?

BOTTOMLINE

MSI GT70 DRAGON EDITION 2

$2,800

PROS

- Fast and powerful
- Excellent game performance
- Fantastic battery life for its class

CONS

- Loud fan
- Limited viewing angles
- Trackpad glitch makes it unusable in most games

BOTTOMLINE

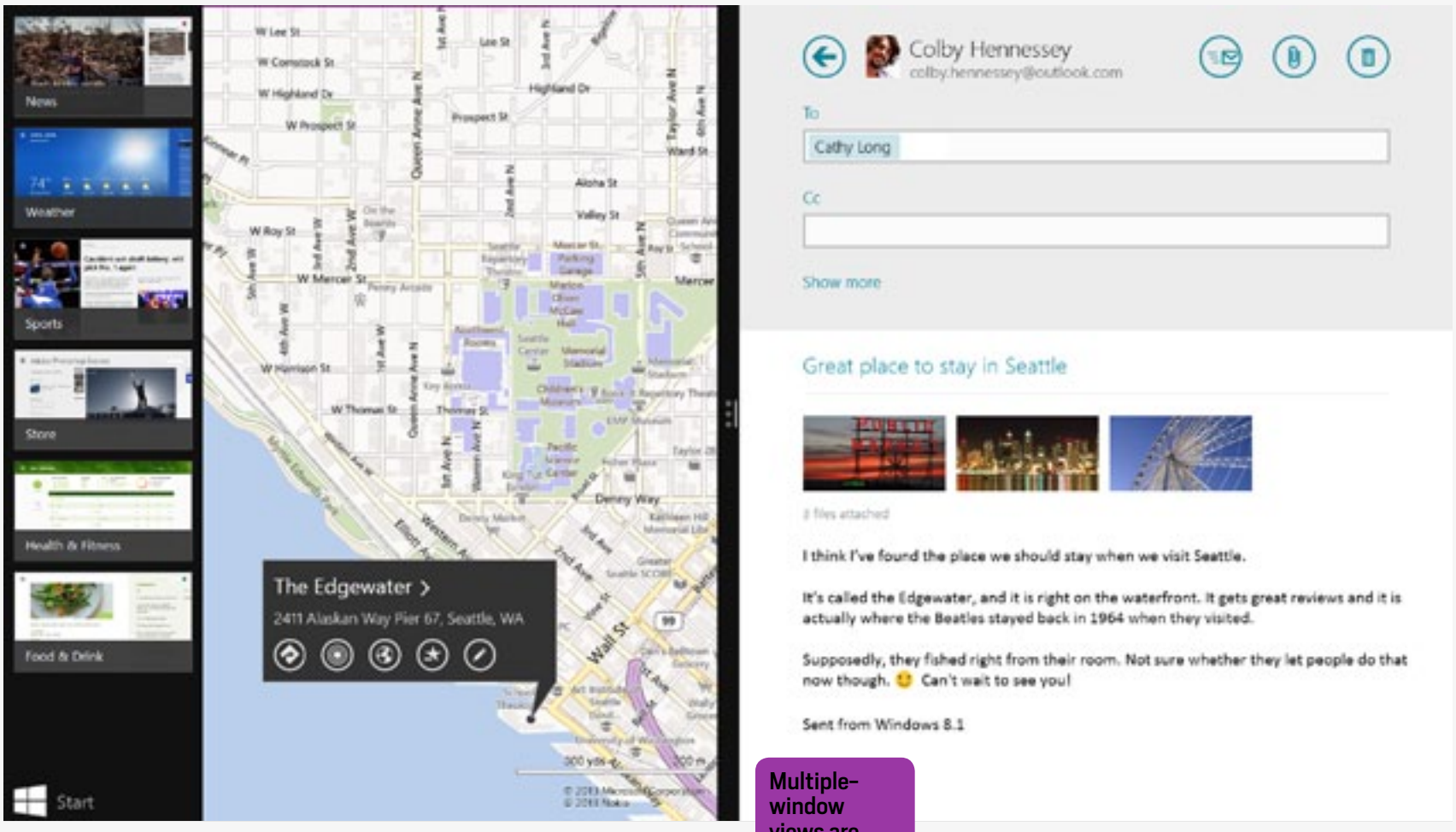
Despite a few workable flaws, the GT70 Dragon Edition 2 is a stellar gaming machine, improving upon the original GT70 without compromising its best features.

WINDOWS 8.1

We take a tour of Windows 8.1 and in this OS update, we see new apps, features and plenty of much-needed tweaks

By Dana Wollman

How big of an upgrade is Windows 8.1? Put it this way: we just might need to review the OS all over again. Microsoft just unveiled the first major update to Windows 8, and it includes tweaks to nearly every aspect of the operating system: the lock screen, Start menu, Windows Store and onscreen keyboard. As we saw in some leaked screenshots, Microsoft also updated its native apps and added some new ones, including a stopwatch and fresh calculator. In some cases, the update even changes the way you interact with the OS. Yes, that means the Start button is



Multiple-window views are now more flexible.

back (sort of). You can now snap more than two windows into place, depending on your screen resolution, and also adjust the width of those columns so that it's not necessarily an 80 / 20 split. Additionally, Microsoft revamped the way built-in search works so that it's now more of a universal search engine, serving up apps, files, settings options and web suggestions.

As you might have guessed, *some* of these revisions are a response to feedback Microsoft has received in the past seven months. In other cases, like with the new settings menu, they were part of Microsoft's plan all along — the engineering team just didn't get to them before it was time to ship the first version of Win 8. As we reported earlier, Windows 8.1 will be available as a free update (in preview) starting June 26th, the day Microsoft's Build developer conference kicks off. We'd still encourage you to follow our Build coverage, however, as Microsoft will be making additional announcements then, particularly with regard to its first-party apps. Also, Microsoft has only shared a handful of screenshots, so we'll have to wait until June 26th to give you the full visual tour. For now, though, join us as we walk you through all the major (and not-so-major) changes.

UI CHANGES

Why bother burying the lede? Better to start off by answering the question everyone is most interested in: did Microsoft really bring back the Start button? Yes, but probably not in the way you expected. With this update, the Start button sits in

Did Microsoft really bring back the Start button? Yes, but probably not in the way you expected.

the lower-left corner and is always visible, so you no longer need to hover with your mouse to make it appear. In an interview, a Microsoft rep pointed out that this brings a little extra visual continuity, as the Start button has the same flag logo you'll find on your tablet, keyboard, etc. But Microsoft also admits this new setup will feel more familiar to users, many of whom have complained about the loss of the Start button. Still, if you were hoping for a return to fly-out menu trees, you're going to be disappointed.

Microsoft seems to understand, too, that some users have found it jarring to constantly switch between the traditional desktop and the modern Start Screen. To help make the whole experience feel more cohesive, the company is also allowing users to have the same background photo for both the desktop and Start Screen. So, when you hit the Start button, it doesn't feel like you're being whisked into a completely different part of the OS; instead, it looks more like the Live Tiles are popping up on top of the desktop. We know, we know: that's not technically what's happening, but you get what we mean: the transition feels seamless.

LOCK SCREEN

From the moment you boot up your PC, you'll notice something different about Windows. With this latest update, you can have a slideshow running in the background, so that you're not limited to just one photo. In particular, those photos can be locally stored, but they might also come from SkyDrive (and by extension, whatever Windows Phone handset you happen to be using). Also — and this is sort of random — Microsoft is able to create seasonal slideshows based on when your photos were taken, so if your spouse's birthday is in January, you might see photos from earlier birthdays come the first of the year.

Additionally, you can do quite a bit more now from the lock screen. For starters, you can accept Skype voice and video calls, similar to the way you can already answer your phone without having to punch in a password first. You can also take photos too, which will probably come in handiest on tablet-type devices. To do this, just swipe down to reveal the camera UI. And no, to answer the question you're about to ask, you *can't* use that as a backdoor way of getting into the photo library. Meaning, if you hand your tablet to a friend to take a shot, he won't be able to see all your previous pics; just the shot he took a few seconds before. Long story short: your selfies are safe.

START MENU

This shouldn't come as much of a sur-

What's especially nice about Windows 8.1 is that you can cut down on the tile clutter.

prise — the cat's already out of the bag — but Microsoft updated the Start Screen with two additional tile sizes. You'll probably notice the supersized ones first; these take up about as much space as four regular ones, and are especially well-suited to email or weather updates — things where there's a lot of information to see. Additionally, Microsoft added some extra-small tiles, which take up a quarter of the space of a standard tile. Maybe you want to use that option with apps you rarely access. In any case, when you're ready to customize your setup, just press and hold an app, then select the resize option.

What's especially nice about Windows 8.1, though, is that you can cut down on the tile clutter altogether. Now, when you download an app, it doesn't go straight to the Start Screen; instead, it lives in the app menu. That should come as a relief to anybody who impulsively downloaded a bunch of freebies from the Windows Store, only to let them sit there. Also, if you do have a big selection of apps, finding the one you want should be a little easier going forward. First off, Microsoft added a gesture wherein you can swipe upward on the Start Screen to reveal the app menu. (There will also be an onscreen arrow button you can click if you're using a mouse.) Once you're there, you can sort your apps not just alphabetically, but also by category, date installed and most used.

And say you do want an app to live on the Start Screen. From the app menu, you can press and hold an app and then follow the onscreen instructions to create a Live Tile. What's neat is that you can also make all these adjustments in batches: just press and hold as many apps as you like, and then give them all the same tile size, or move them into a group. It's a more convenient way of creating groups, for sure, but Microsoft is actually hoping the benefits will be two-fold: by interacting with the Live Tiles this way, you're unlikely to accidentally move apps around simply by swiping the Start Screen, which is something a lot of people have complained about, according to Microsoft.

Finally, the Start Screen is getting some new personalization options. Now, when you select a background, you get to choose from a sliding scale, so the options are much more nuanced than they were before. Also, Microsoft is introducing some moving backgrounds — things like floating robots and a dragon with a wagging tail. All told, they're sort of like the live backgrounds on Android, just a bit more subtle.

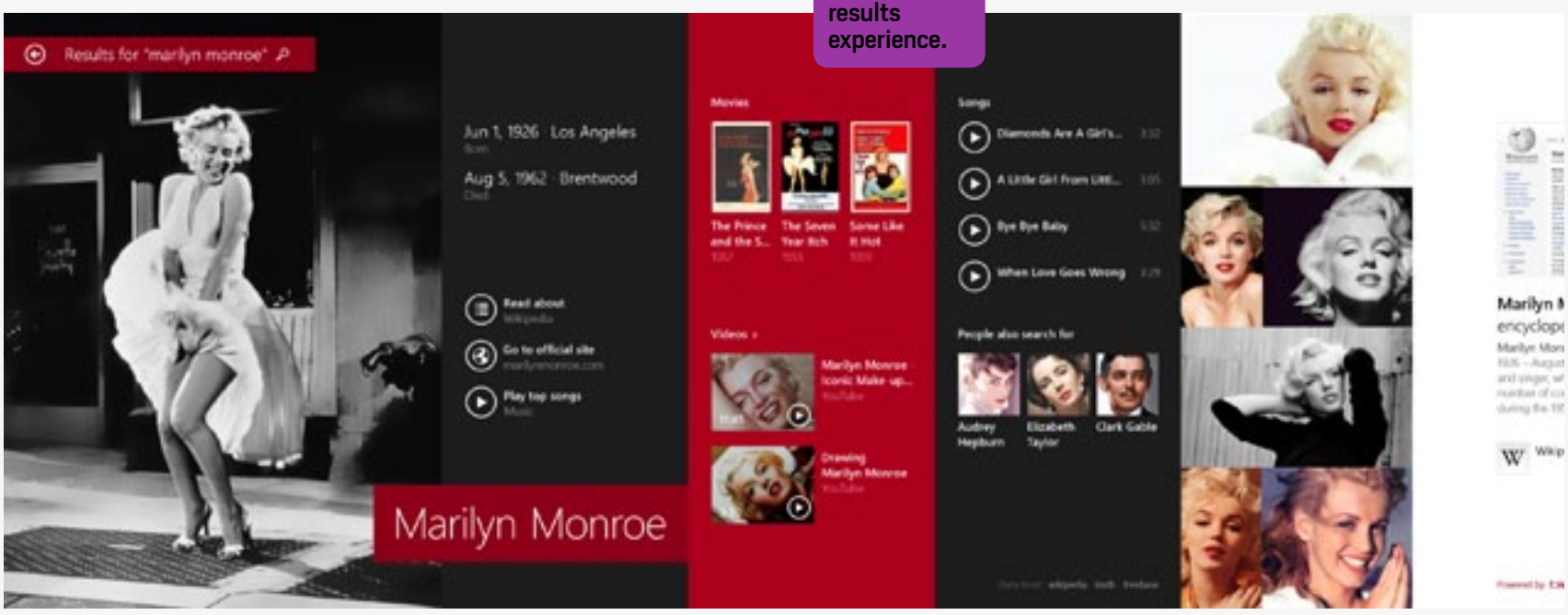
SEARCH

Before we talk about what's *new* in search, it might help if we recap the way it works now. Currently, if you were to search for, say, *Angry Birds*, you'd see a list in the right-hand pane with links for relevant apps, files and settings. So, if you were looking to launch the game *Angry Birds*, you'd hit "apps." If you wanted to bring up a draft essay on the history of *Angry Birds*, you'd select "files." If there were an *Angry Birds*-related setting in the Control Panel, well, you get the idea.

That's how we search for things today. But come June 26th, Windows will serve up direct links to apps, files, settings and web suggestions. That means no more clicking "apps"; you can just get to the *Angry Birds* app with one less tap. Additionally, you can play music from search, and it'll bring up either songs you already have in your library, or tracks you've added to your collection in Xbox Music. So, for example, you can type "play Janis Joplin" in the search bar, and then you're one tap away from listening to Janis, so long as you have some of her music already or already added her to your list in Xbox.

> It's more than just a revision of the way Windows displays search results.

But there's still a big piece of the story left, and it's more than just a revision of the way Windows displays search results. Say you search for something the way you would on Bing. Maybe you type in "Kate Upton" because you want to see her *Sports Illustrated* cover, or know how old she is. As ever, Windows will scan your files, apps, etc. for mentions of Kate. But it might *also* provide a link inviting you to learn more about Kate Upton. Click that and you'll get what's called a "Search Hero," which can only be described as a curated app



Search Heroes offer a curated-results experience.

with content related to whatever it is you just searched for (note: not all queries will yield Search Heroes).

In terms of the layout, it actually looks very similar to the Bing News app, where you can already see a mix of stories, photos and videos. Except in this case, it's an app with just Kate Upton tidbits. As you click around, you may get tossed over to other programs; if you hit "read more about Kate Upton," for instance, Windows will open your Wikipedia application. It's a very rich experience, and customizable, too: you can even sort photos by *color*. Want to see a photo of J. Lo that time she wore a dress with a neckline down to her belly button? Just filter for the color green and you should be set.

MULTITASKING

As we noticed even in the leaked screenshots, Windows 8.1 takes a looser approach to multitasking. For one thing, you can snap more than two windows in alongside each other, depending on your dpi and screen resolution. For instance, the Microsoft rep leading our demo was using a new Toshiba Kirabook with a 220-ppi, 2,560 x 1,440 screen, and that was enough to support four side-by-side programs. In addition to supporting more windows, though, the new OS also allows you to adjust the sizing of each windowpane so that you're not forced to put them in an 80 / 20 split. Now you can go 50 / 50 if you like, or maybe 60 / 40.

Really, though, Microsoft hopes you don't have to do that much fiddling with the window size: the company's engineers have coded the new OS so that it intelligently chooses the ratio for you, depending on what you're doing. For instance, if you open a photo from an email, it'll open as a 60 / 40 split, with the photo getting more screen real estate. If you click on a link in a message, however, it'll be a 50 / 50 layout by default.

WINDOWS STORE

The Windows Store has also been overhauled, with larger tiles and more info under each app listing (for things like the rating, et cetera). It's a little easier to find the top paid / top free charts, which you can get to by swiping left. You can also swipe down from the top to see a list of all the categories, if that's how you'd rather search. To that end, Microsoft's introducing a new recommendation engine to make it easier to discover apps you haven't heard of yet. Based on a variety of factors (what apps you have, what's highly rated), the Windows Store will show related apps every time you're on a download page, considering whether or not to buy something. That's nice for consumers, of course, but it's good for developers too, who now have a better chance of their apps getting noticed. And we *all* know how Ballmer feels about developers.

Lastly, and this isn't really a design change so much as a behind-the-scenes one, apps will now automatically update

in the background. So it's unlikely you'll ever fire up the Netflix app again only to realize you need to update it first.

TOUCH KEYBOARD

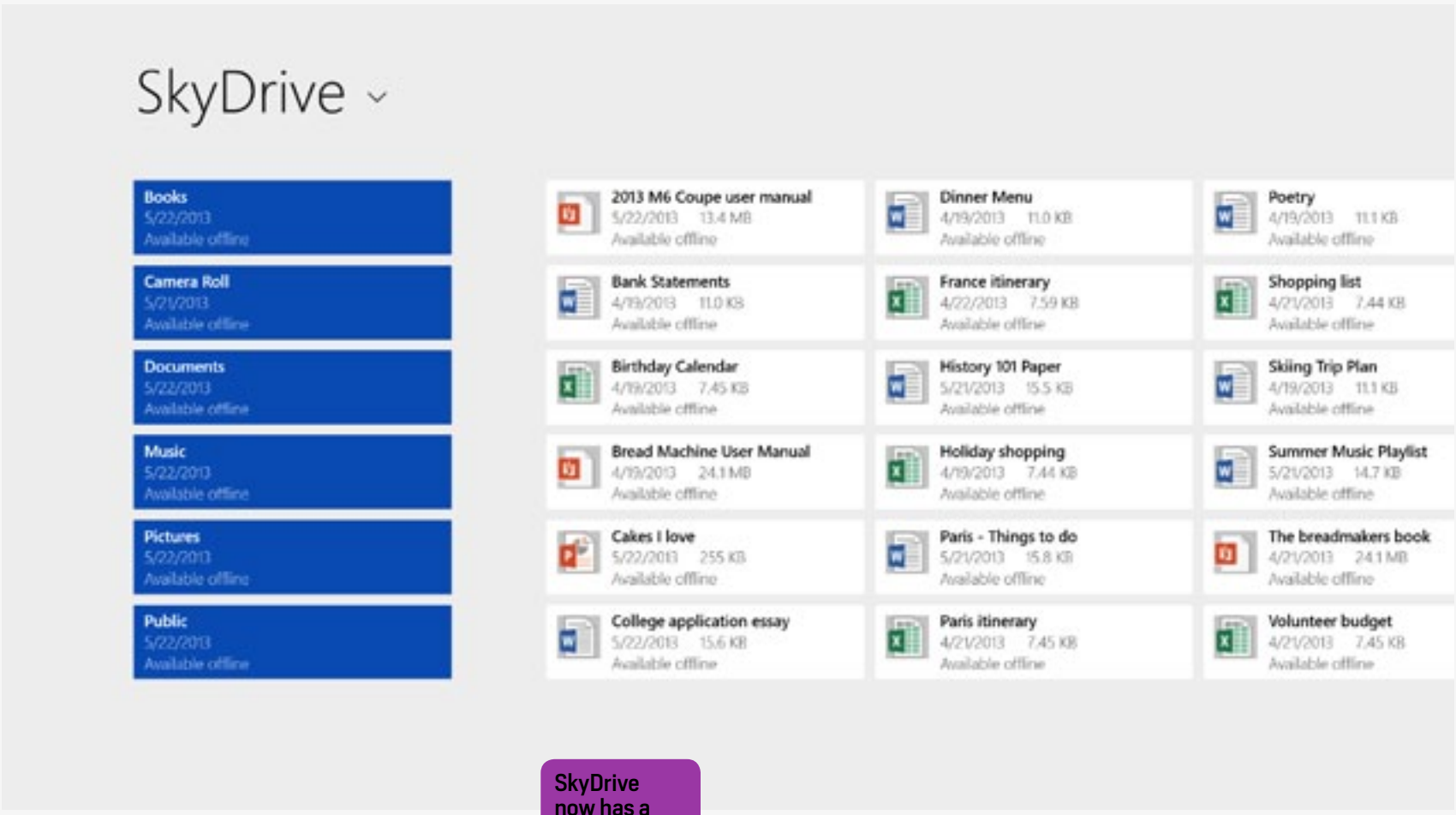
As we hinted in the intro, the onscreen keyboard in Windows 8 has received a serious makeover. Starting with the most significant update (in our humble opinion), you can now long-press a key to get to certain secondary functions. In this layout, for instance, the "T" key doubles as the "5" button, so if it's that number you're after, you can long-press "T" and then tap a little pop-up with "5" on it. This works for entering punctuation symbols, too, as well as special characters like an umlaut. And by the way, you don't need a German keyboard to get an umlaut; regardless of what language you have set up, you can get at all sorts of special characters, even ones that aren't common in your native tongue. Speaking of which, these new keyboard features will be available for all of the 109 languages that Microsoft fully supports in Windows 8, though so-called language packs don't count.

As it turns out, once you get the hang of this new keyboard, you don't even *need* to do a long-press when you want to enter special characters. For instance, once you learn that the exclamation mark pop-up is due north of the question mark button, you can just swipe your finger up on the question mark key and the keyboard will understand you meant to add an exclamation mark. So far as we can tell, it works reliably: the Microsoft rep doing the demo never accidentally hit the Enter key while swiping up. Still, we'd prefer to reserve full judgment until we can test this ourselves — it's not like the Microsoft team has had time to practice or anything, *right*?

Additionally, the new keyboard has pop-up spelling suggestions — three in total, every time. As a time-saver, you can hit the space key to cycle through suggestions so that you don't have to take your hands off the keyboard. Finally, Microsoft revised its algorithms so that accuracy is now rated at about 90 percent, up from around 60.

SKYDRIVE

Windows 8 has always had a SkyDrive app, but with this latest update, Microsoft's cloud service is built much more deeply into the OS itself. Basically, until now the app has been just a mirror into what you had stored on SkyDrive.com. It didn't sync automatically; you had to manually upload files to the site before anything new showed up in the Windows app. Now, it's constantly syncing in the background, regardless of whether you have the app open or not. Specifically, what you'll see when you launch the application are so-called stubs — previews just detailed enough to remind you what the file actually contains. Once you click on it, though, you'll need to wait for your computer to download the full document, which hopefully shouldn't take long. As



SkyDrive now has a background sync option for your files.

time goes on, too, you can specify what kinds of content SkyDrive syncs in the background; if you don't want to automatically bring Word docs onto your PC, that's your call.

PC SETTINGS

This is one of those things Microsoft just didn't get around to completing before the deadline for shipping Windows 8. In the current version, the Modern-styled settings menu only has a handful of options — relatively few compared to what you'll find on the traditional Control Panel. Now, though, Microsoft's ported over all those advanced settings so that the PC settings menu mirrors the Control Panel. (Just with a prettier interface.) As a result, there's no longer a "Miscellaneous" category, since every setting now has a proper home.

APPS

IE: IE10 generally looks the same, except for one big difference: the tabs now sit at the bottom of the page, just above the address bar. In addition, you can now open an unlimited number of tabs in the Modern version of IE, which gives it more parity with the desktop version of the browser.

Photos: For those of you who thought the built-in Photos app was a tad perfunctory, Microsoft's updating it with all sorts of editing tools, including auto fix, temperature, tint, saturation, color and "Basic Fixes," which is exactly what it sounds like. Also included: various effects and photo filters, similar to what you'd already expect on a typical phone or tablet. A partial list includes: retouching, redeye, crop, selective focus

and vignetting.

Lastly, there's a neat Color Enhance tool that lets you adjust the color on one specific part of the picture (say, the blue of the ocean). We watched a Microsoft rep demo this, but didn't get to try it ourselves, so this is probably something we want to circle back on when we eventually publish our first hands-on piece.

Xbox Music: We suspect Microsoft is going to do a deeper dive on this at Build, but for now, here's a primer. All you need to know is that the Xbox Music app has gotten a big makeover so that the emphasis is more on your existing collection, rather than discovering new tracks. By default, your music is organized by artists, albums and songs, though you can, of course, still discover new content if you so choose. In particular, Microsoft said Xbox Music is getting a "Radio" feature, which is said to be like Smart DJ, only better. That's all we know for now — and it's really not much — which means Microsoft will almost certainly need to follow up at Build with more details.

Reading List: According to Microsoft, many users have been asking for a bookmarking feature — a way to share things with *themselves* in addition to other people. Well, for those of you who can't live without services like Instapaper or Pocket, Microsoft is introducing Reading List, an app that saves all the interesting things you found online, but wanted to save for later. When you're ready to clip something, just hit the Share button in the Charms Bar and select the Reading List option. Oh, and your bookmarks will roam from one Windows 8 device to another. Eventually, Microsoft will add support for Windows Phone handsets too, just not at launch.

The app itself is styled in much the same way as Microsoft's other first-party apps, with large tiles you swipe through from left to right. When you open something in the application, the article will take up most of the screen, with Reading List snapped into place along the side, taking up about 20 percent of the screen. Of course, though, now that those side-by-side windows are resizable, you can rejigger the ratio any way you like.

Calculator: It's hard to believe Windows 8 didn't ship with a Modern-style Calculator app, but it's true: until now, we've only had the classic calculator on the desktop. Now, Microsoft is adding a calculator for the Modern UI, which we actually got to try out back when an early build of Windows 8.1 got leaked. As we reported at the time, you can use it as either a numeric or scientific calculator. Also, perhaps best of all, it does unit conversions — everything from length to weight to temperature. You can definitely count this among our favorite new features.

Alarms: Here's another Windows app we sometimes forget we didn't already have. The new version of the OS will bring an alarms application that does triple duty as a stopwatch and countdown timer as well. Admittedly we didn't spend much time with this in our demo, but we can say that setting the time is both fun and easy: just spin your finger around the clock until you have it set to the time you want.

Bing Food & Drink: Now this is pretty cool. As the name suggests, Food & Drink is an app where, among other things, you can find recipes. What makes it noteworthy, though, is that Microsoft added a hands-free mode, allowing you to flip pages in a recipe without touching the screen. Just wave your hand in front of the webcam, and the app will move on to the next page, sparing you from having to touch the screen with your greasy, sauce-covered fingers. And because all you need is a camera, it should work on all sorts of legacy devices, even those without any sort of fancy gesture-control technology baked in.

As for those "other things" we alluded to, you can use the app to plan meals, create shopping lists and learn new skills, like sharpening knives.

Bing Health & Fitness: This, too, is mostly self-explanatory. With Health & Fitness, you can monitor your nutrition habits, exercise routine and even your overall health. Let's focus on that last bit, because it's what makes this unique from other fitness-tracking apps, like Fitbit, et cetera. Using the app, you can tap an onscreen diagram of a body to indicate what sorts of symptoms you're experiencing. From there, Dr. Microsoft attempts to diagnose you, using medical information pulled in from various online sources. In an interview, Microsoft assured us it's only bothering with "reputable" services, but we've yet to see a full list. Even then, common sense still applies: if you normally wouldn't let WebMD diagnose you with a sinus infection, you can take this app with a grain of salt too.

WRAP-UP

See what we mean when we say we might have to review Windows 8 all over again? The final word count here is longer than on most product reviews, and this is just a news announcement, not even a hands-on! We'll be back with more detailed coverage later in June, when Windows 8.1 becomes available for download and when we get a chance to try it ourselves (as opposed to a guided demo). And be sure to follow our Build coverage, as Microsoft has already promised it will have more news to share, particularly around its various apps. D

Dana Wollman is Reviews Editor at Engadget, a marathoner, lover of puns and a native Brooklynite.

Verizon's Innovation Center

Incubating the next generation of connected devices keeps the 'dumb pipe' naysayers at bay

By Darren Murph

PHOTOGRAPHS BY DARREN MURPH

IT'S NO SURPRISE, REALLY. Offline devices just don't carry the allure that they once did, and in fact, yours truly would argue that they simply lack the requisite functionality to become runaway hits in the modern era. It's genuinely difficult to think of a flagship consumer electronics product, with a display of any kind, being engineered in the year 2013 without at least some level of internet connectivity in mind. Even a Kickstarter dream dubbed Pebble would be borderline useless without an online link, and as consumer demands shift dramatically towards expecting more for less, it's the carriers who have found themselves positioned to take advantage.

Verizon's Innovation Center is tucked away discreetly in a nondescript business park. The real magic happens within.

Verizon has joined a host of other megacorps in launching so-called innovation centers across the world. Earlier this year, Samsung committed $1.1 billion to create a pair of Open Innovation Centers — temporary homes for upstarts looking to woo Sammy's check writers into believing in their technology. In 2011, AT&T's Palo Alto, Calif.-based Foundry innovation center joined similar entities already running in Texas and Israel. In a nutshell, these facilities exist solely to ensure that pretty much everything with a circuit board also ships with an AT&T radio. Microsoft, Intel and Vodafone have all done likewise in the past three years.

I recently had the opportunity to visit Verizon's first Innovation Center — a sprawling facility located squarely in Massachusetts' famed Route 128 technology corridor. The center opened in Waltham in the middle of 2011, and now enables roughly 25 employees to "largely operate outside" of what you probably associate with the word "Ve-

rizon." What I found was the world's greatest case against the existence of a "dumb pipe" — a phrase often used to describe carriers that do little more than provide access to a network. No structured technical support, no humans on the other side, no bloatware on the devices they sell. Companies who show up looking for aid in the art of interconnectedness face no fees, no risk of surrendering intellectual property and no requirements of exclusivity. *This* is the future of the wireless carrier: an increasingly vital component in making tomorrow's whiz-bang gadget one that this generation will actually crave.

Mercedes-Benz was one of the center's first customers, equipping select automobiles with over-the-air updates.

IF YOU BUILD IT, THEY WILL COME

The facility is fairly nondescript from the outside — save for that unmistakable Verizon logo visible through panes of crystal at the entrance. But, as with most high-security office buildings located within business parks, the real magic requires an ID badge to see. Upon entering, I'm blitzed with red. It's on the floor, on the walls and emitted from a smattering of overhead projectors. As far as the eye can see, it's one concept after another — or "visionary product," as director of Verizon's Innovation Program Praveen Atreya puts it. It's quite clear that the goal here is to boast a bit about what this center has accomplished in two years. Atreya points to a Trek bicycle that's equipped with a camera, a battery pack, biometric sensors and a Fujitsu clamshell PC. As he tells it, Verizon teamed up with Ericsson after it asked a group of kids in Dallas to think of something that's not currently connected, but should be.

The end result is a conceptual, but totally rideable, mountain bike that would certainly go over well on the next X Games. (Street legality, of course, is another matter.) Atreya confirms to me that projects like this end up generating interest elsewhere — while the Trek was merely a cute idea, he tells me an undisclosed bicycle manufacturer is "currently in talks" with the carrier about a connected bike. Immediately, my imagination runs wild. What would be possible if a bicycle's internal sensors could evaluate

elevation changes, braking habits, speed and the rider's change in heart rate? And then, what would be possible if all of that data were sent to the cloud for real-time processing? In-ear feedback on what gear to switch to? Occasional reminders on how you're tracking in terms of time? Archives of statistics for those in training?

The impending connected bicycle is just the start. Both Atreya and Gagan Puranik, associate director for Verizon's Innovation Centers, say this lab was concocted shortly after the operator placed its 4G bets on LTE. "It was built proactively," Puranik states, replying to an inquiry about whether the center was built due to partner demand or by VZW's hopes for the future. Indeed, carriers have been mulling ways to avoid becoming dumb pipes for years.

Mobile users in Europe have grown quite accustomed to the bring-your-own-device (BYOD) regime; simply buy the unlocked phone of your choice, walk into a carrier store and depart with a functional SIM. In almost every case, it's cheaper for the savvy user. But it also puts the carrier in a precarious spot: if you're only in the access business, how are you hedging your bets?

I JUST WANT TO BE YOUR EVERYTHING

Puranik and Atreya agree that Verizon is aiming to be "more than just a carrier." The term "services provider" is

A conceptual bicycle that's connected six ways from Sunday. It won't reach production, but it's something to build off of.

tossed around with abandon, but I get the feeling it's more than lip service. As I roam the halls of the showcase area, I spot a fount of products that would simply feel uninspiring without an always-on connection. A home health-monitoring system that can't be eyed remotely? Fairly useless. A security system that still requires a landline? Hardly titillating. A washing machine that can't monitor neighborhood energy usage in order to activate when power is cheapest? Pardon the yawn.

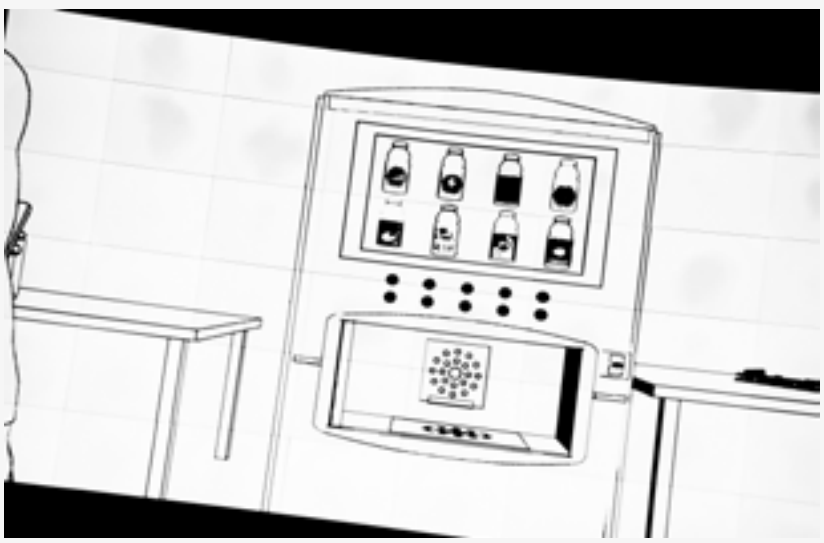
A telepresence robot [left] and an electric vehicle charging station, both embedded with LTE modules for sending and receiving vital data.

To combat the rising tide of boredom, Verizon created an entire business that exists solely to connect things to the internet. This is what people mean by "The Internet of Things." Taken to its extreme, it's a mythical world where each and every product we touch is linked to the same internet, and in theory, to an overarching ecosystem that enables our lives to be lived in a more intelligent and efficient manner. Utopian? Oh, absolutely. But the products I'm seeing here are proof positive that we're already (partially) living in such a society. Of course, it's not as if Verizon's doing this for the good of mankind. It's looking out for its long-term benefit. While connected devices will surely please consumers, Verizon knows that other carriers would eat (or already have eaten) from this slice of the pie should the company wait idly by.

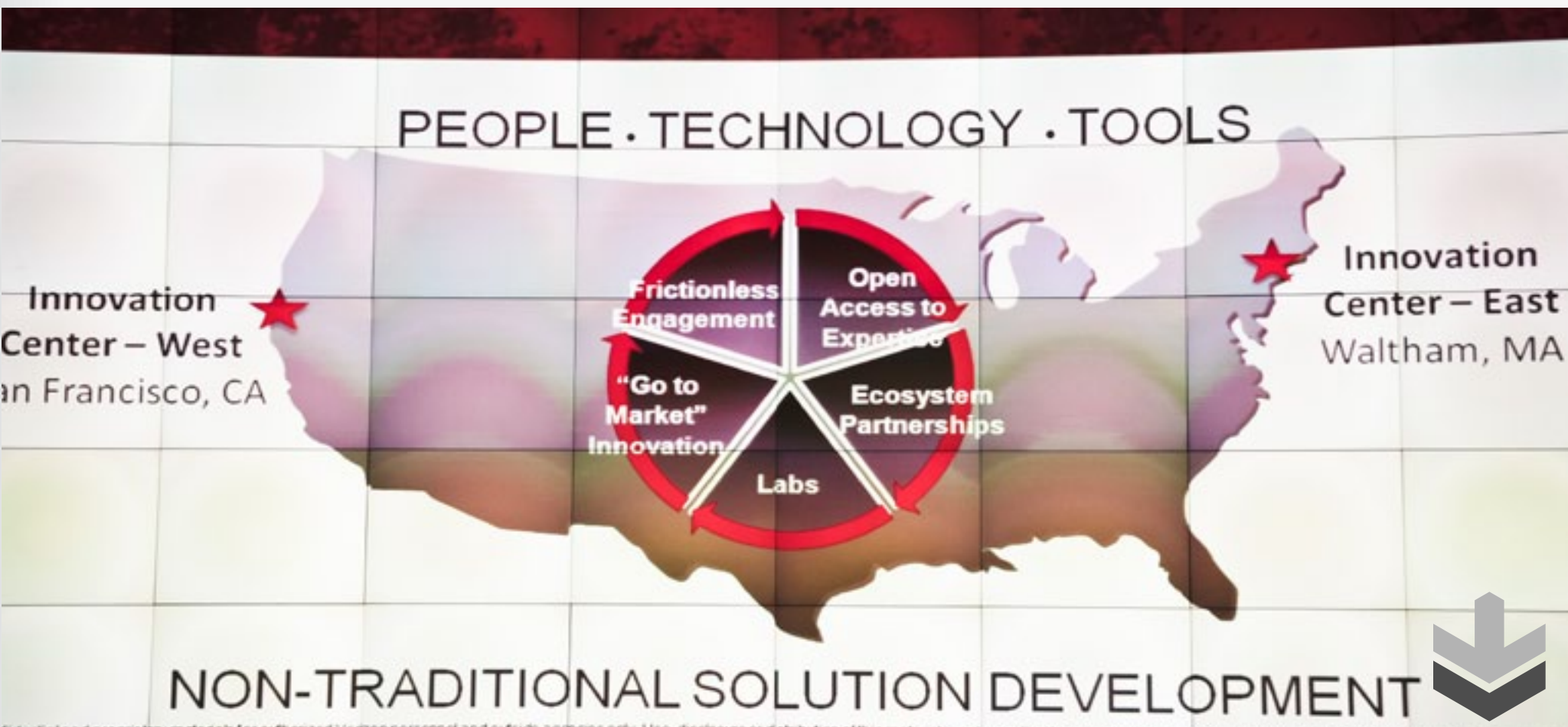
And, of course, Verizon would much rather see a shelf full of third-party products with a VZW radio than a shelf full of products ready to support whatever SIM card a consumer brings along.

What Verizon has accomplished thus far could not have been done on older 3G networks. The power of LTE — for all carriers, in fact — is that it's actually faster than what applications presently need. We see the same phenomenon whenever a new GPU is released to gamers; for a small window of time, the backend horsepower exceeds the application demands in the market. Of course, the moment Thinx — a company showcasing an LTE-embedded security camera — swaps its 720p sensor for a 4K one, the ball will then be thrown back in Verizon's court.

To date, "over 30 products" have gone from incubation to market via Ve-



Connected kitchens, hospital beds and vending machines: all just the tip of the iceberg.



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rizon's Innovation Center. For example, Verizon has enabled wireless updates in select Mercedes-Benz automobiles, LTE video streaming in Thinx's security camera range and remote monitoring of fill levels within BigBelly Solar cans. I'm told that items arrive in all manner of stages. Some companies show up with a finalized product that merely needs an embedded LTE module and a spit shine on the firmware level; some outfits arrive with charcoal sketches and a wry grin. Verizon's not saying how many projects have entered and failed, but that's mostly due to the youth of this facility; rather than rushing a product out of the door. Verizon has every reason to let things simmer until it can time the market right.

Puranik tells me there's "no predetermined length of time" for an item to be within Verizon's labs. He also notes there are "a lot more than 30 [products] in the Innovation Center pipeline scheduled to ship in 2013 and 2014." According to Atreya, Verizon's vision when it set this up years ago "was to incubate, develop and ship commercial solutions." Now that it's in motion, there's a constant balancing act between inviting "high-volume products" into the mix (an example being Netgear's MBR1000 router) and keeping visionary kit rolling through the door

A look inside of Verizon's Innovation Center makes it tough for would-be partners to not be impressed.

"as a means of inspiration."

Atreya tells me Verizon has the "technology, tools and people to transform ideas into connected products and solutions," be it a "device, app or accessory." Currently, the operator has some 200 partners — from software engineers to antenna makers — tucked within an ever-growing black book. If a company arrives with a problem that VZW's own personnel can't solve, there's a fairly good chance one of those 200 others can. If you're an inventor, why go anywhere else? Because this facility exists, you have fee-free access to a laundry list of people that can help bring your dream to reality, and if it's funding you need, Verizon's created an arm for that, too. *And*, if you're able to produce something that's marketable, Verizon's not going to stop you from taking your wares to AT&T in order to ship a version that can be used in Puerto Rico — or any other area that Verizon lacks coverage. Frankly, it's almost too good to be true; but on the other hand, what choice does Verizon have? You either extend the hand now, or wait for companies that would be planning a visit to Waltham to solve their connected woes through other means.

A DEAL YOU CAN'T REFUSE

I ask both Puranik and Atreya about the split between push and pull. Or, the ratio of companies pinging Verizon for help versus those showing up at the center's request. While neither gentleman would give me a firm number, I can tell that it's shifting. They're quick to admit that upon opening the lab, it was largely Verizon making calls to companies it thought would benefit from adding connectivity. Now that the doors have been open a while, there are far more inbound requests to deal with — a trend that Atreya suggests won't be reversing anytime soon. In fact, Verizon has been forced to expand its San Francisco-based Innovation Center because there are more companies seeking access than the present facility can house.

A handful of actual launch partners are on hand to discuss their journeys, and Matthew Volpi from BigBelly Solar has one of the more interesting tales. After launching a line of compacting trash bins a decade ago, the company realized that waste-management outfits could gain huge efficiencies if these bins reported fill levels back to base. It actually began shipping solar compactors with AT&T modules a few years ago, but because Verizon's policies were so welcoming, they simply wheeled an AT&T version into the Innovation Center and asked to partner up. In "a few months," I'm told, the first VZW-equipped compactors will hit streets — and Big Red isn't making BigBelly convert those already on a rival network.

Beyond the showcase floors sit a number of offices, and more importantly, a range of RF-shielded rooms that house any number of incubators at a given time. Just inches away, Qualcomm and Ericsson could be gathered in the same facility testing competing

What's better than a heads-up display on a firefighter? One that can receive real-time updates over LTE.

"The power of LTE ... is that it's actually faster than what applications presently need."

solutions. On Verizon's dime, no less. I actually get to visit one of those very rooms, and the included hardware is nothing short of astonishing.

Incubators are able to recreate the signals of nearly every carrier in the world within a 10 x 10-foot cube. They're able to simulate a signal at 300 miles per hour in the event that their product needs to be compatible on a bullet train from the future, and they're able to test gear on a network that's being maliciously attacked from every angle. They're able to assess an LTE-to-3G handoff with a trip through a tunnel in between. They're even able to analyze new products on Verizon's VoLTE and LTE-Advanced protocols, long before either is released for public use. It simply cannot be understated how immensely valuable this is for a company looking to launch a connected product *that works*. For the vast majority, building an environment like this would take an impossible amount of cash, and moreover, a request for broadcasting approvals from the FCC that aren't handed over to just anyone.

For those wondering about the importance of data (or, looked at another way, the waning criticality of simple voice services), the Innovation Center is only set up to handle IP testing. In other words, data or voice transmissions

Startups are given access to this: contained wireless network scenarios from all over the world.

A demonstration showing a connected tablet talking to a home security system.

over data. You'd probably expect nothing less given the title of the place, but it's safe to say that Verizon's cutting edge has certainly labeled 1xCDMA as antediluvian, and trusts that every new connected product being engineered today will rely on the internet for every facet of communication.

WISING UP

It's painfully easy to knock Verizon Wireless for its consumer-facing practices. Strong-arming users into a tiered data plan by removing subsidy payments on new devices for those who still value "unlimited"? Pathetic. Taking the guillotine to its New Every Two program? Disappointing. Cluttering up every Android phone that comes its way with apps you don't want? Shameful, indeed. In the effort of giving credit where it's due, however, the Innovation Center is a breath of fresh air in the carrier world. It's almost alarming how pro-consumer the entire concept is, but it's all because of one overriding theme: this is a long game for Verizon.

In the short run, it would benefit far more by charging astronomical fees for the privilege of using its testing grounds, and if it grabbed a stake of every idea it helped bring to market, well, let's just say there's money to be made in electronic royalties. But all of that would be destructive to the actual mission, which is to simply have more devices paying to *connect* to the Verizon network than any other. The long game, you see, is to simply be the best at what it is: a pipe. A smart one. D

Darren holds the Guinness World Record for being the most prolific professional blogger on planet Earth. He's also an argonaut.

THE ENGADGET INTERVIEW

David Cope

Switched On Bach: David Cope's Computer Compositions

By Brian Heater

PROFESSOR DAVID COPE SPEAKS in purposeful abstraction, attempting to brace us for what we're about to see. We've been on the road for a while now, I tell him. We've seen a lot of strange and wonderful things — robots and space shuttles and ghost hunts. "Yes, well," he answers quietly, as we ascend the stairs of his Santa Cruz, Calif., home. "I guarantee you've never seen a laboratory like this."

It's hard to say precisely what we've gotten ourselves into. It's a fairly standard suburban house from the outside, a few blocks from the base of the hill that holds the University of Santa Cruz. In amongst a forest of redwoods, it overlooks the pristine wilderness of the central coast that so famously inspired Kerouac, Miller and Steinbeck. Cope, a lifelong music professor, wears a denim jacket, floral button-up, white stubble and a sly smile. If there exists a walking manifestation of Santa Cruz, it might well be him. It's the perfect uniform for an unassuming computer music pioneer.

There's nothing of particular note to speak of downstairs in the living room, where Cope gives lessons on a grand piano littered with any number of music books. When we first arrive, Cope's wife answers the door slightly confused and momentarily sure that we're there to sell magazines — the professor, it seems, has forgotten to inform her that our arrival has been pushed up by an hour.

Professor Cope believes in the algorithmic basis of things, from wind chimes to the functioning of the human body.

From upstairs, Cope suggests we shoot the art lining the walls above the piano as he readies himself for our conversation. “I made them on a computer!” he excitedly exclaims about the planetary orbs and psychedelic swirls — mathematical, formulaic interactions imprinted into a bronzed-aluminum backing. They’re a small selection of a seemingly infinite and diverse collection of Cope’s artistic expressions that decorate the house.

Cope opens the door to his “laboratory,” the small upstairs office where he creates much of the work that drew us to him in the first place. He’s right, of course; there isn’t a space robot around that would prepare one for Cope’s workspace and its wind chimes — hundreds of them, by rough estimate, of every shape, size and tone, from all corners of the world. If you’ve been in the position of having to buy the professor a gift over the past few decades, they are a go-to. And Cope will happily tell you the collection represents far more than just a propensity for dangling porch knickknacks. It speaks to a much deeper theme that runs across several decades of work.

I believe that the human brain works algorithmically. We blink our eyes, and our breathing and our heartbeat, and the blood going through our veins; the way in which our mind works is all algorithmic.

“Like the wind chimes that surround us here, I’m interested in algorithmic things,” Cope explains, shortly after taking a seat a few inches below the cluttered overhang. “I believe that the human brain works algorithmically. We blink our eyes, and our breathing and our heartbeat, and the blood going through our veins; the way in which our mind works is all algorithmic.”

Cope turned 72 last month, and while the nearby university deemed him a professor emeritus this year, his title is seemingly the only indicator of having slowed down. His laboratory is equally cluttered below the wind chimes, with piles of sheet music, notebook scrawl

A vast collection of wind chimes from around the globe adorn the ceiling of the professor's "laboratory."

and stacks of books, many bearing his name on the spine. Most notable among these is *New Directions in Music*, a tome first published in 1971 and currently in its seventh edition.

"[It was] the only book of its kind at the time, and it was involved with the musical avant-garde," Cope explains, without a note of ego. "At that point there was very little on computers and music composition, but at least I had a small portion of that book involved."

His follow-up, *New Music Composition* would delve far more deeply into the subject of computer music, right around the same time he began dabbling in the form himself.

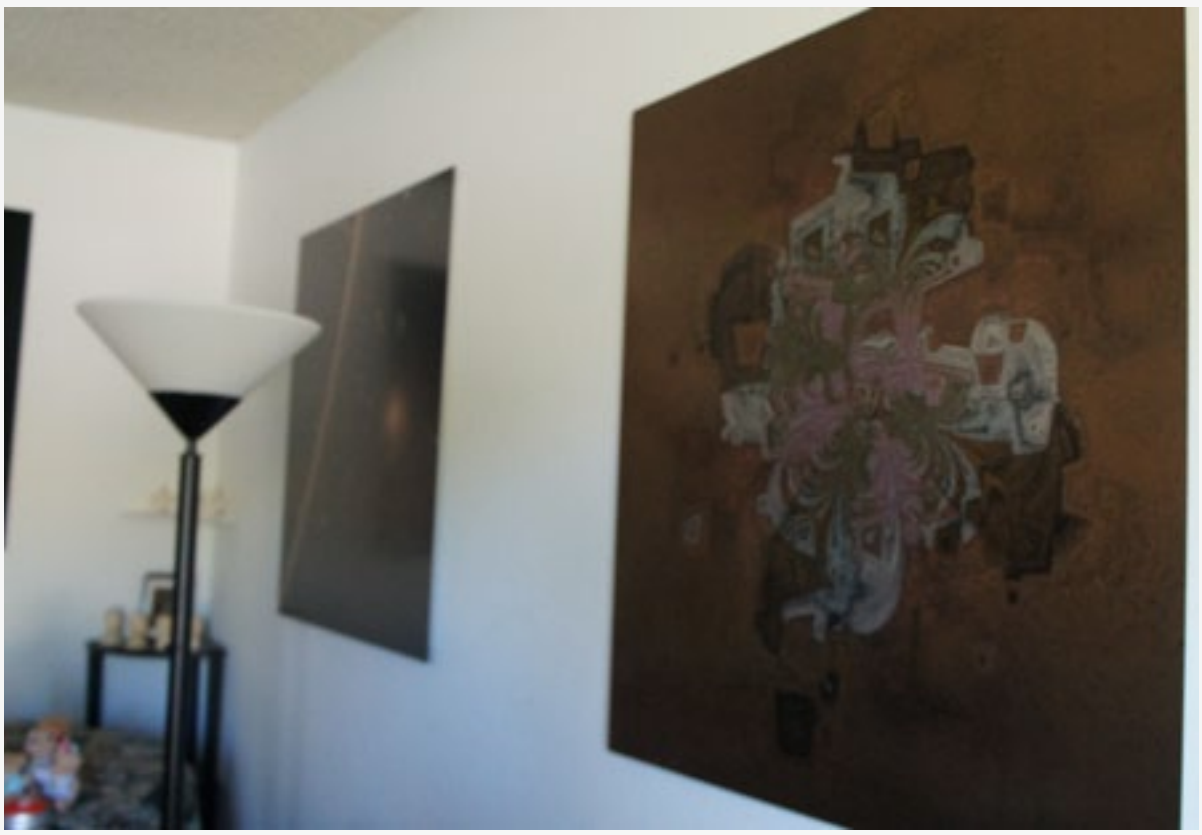
"I [composed] a piece using an IBM computer using punch cards," says Cope. "This is 1975, and it took [an] enormous amount of time to program and a very long time to actually get the results out, because the cards that we received an answer, in response to the input, had to be converted from those little holes in the punch cards to actual little physical notes on a page. But it succeeded — at least in getting performed." The professor pauses and adds, thoughtfully, "It was an awful piece, just truly

dreadful." Awful, perhaps, but it was a start.

Early the following decade, Cope began work on an opera, while staring down the barrel of a particularly nasty bout of composer's block. "I couldn't figure out why C# is any better than C to begin with," explains Cope. So, naturally, he did what any composer with a deep fascination in computer-generated music would do: he set out to build a system that could write an opera for him.

"I had a bit of a problem trying to figure out what my style was, so I chose Bach to imitate," Cope says. "I ran aground a few times before I succeeded in a program that uses a lot of data in the form of Bach's music, and a small analysis program, which analyzed the music for its rules, and then used that analysis to create new music in the style from the music in the database, but not actually replicating any actual piece in the database."

Experiments in Musical Intelligence (EMI) began in 1981, a project Cope affectionately nicknamed Emmy, in a tender bit of mechanical personification. It was a slight blurring of the lines that foreshadowed some of the inevitable questions surrounding the nature of creativity that such a program would pose. With the program capable of spitting out convincing Bach, Mozart and even Cope when fed the proper musical metadata, it immediately called into question the role of abstract concepts like creativity and inspiration.



Cope's computer-designed works of art are born from mathematical and formulaic origins.

Cope happily demos the 30-year-old program for us on an aluminum PowerBook, a far cry from the ancient beige Apple desktop that sits in the corner of the room, an ever-present reminder of Emmy's origins.

They just have these little deviations, which come from mistakes. The program is not statistically based, and therefore it will sometimes be very creative with these things.

The choir, Cope adds, wouldn't fit in the room, so we're stuck with listening to computer-generated sounds for the time being; MIDI-like music, in the place of beautiful choral singing. It's not the ideal way to hear a computer-generated Bach chorale, but given our budgetary restraints, it will do.

"I want to prepare you for the fact that it's not going to hit the top 10 any minute based on that," the composer adds with a smile. "But if you can be liberal in your thinking about it, you can hear the music as it would sound in a concert hall with a 16-voice, 32-voice choir singing it."

He enters the number of chorales he wants Emmy to compose (just one at the moment, though he notes that, at one time, he asked her to create 5,000, all of which can be downloaded from his site) and then, fittingly, clicks "compose." A few moments later, she begins, with her human creator listening intently along, conducting with his right hand.

"I would rate that one 'fair' at best," Cope begins, after a pause. "It was a good progression. It was very interesting. The cadences coming seemingly too far apart, and it ended incorrectly with, in this case, an E on top instead of a C. So I would rate it as maybe a C+ for output, and that's pretty bad."

Cope and Emmy try again. Another C+. On the final go-round, things are looking slightly up. "The ranges were a bit off," Cope explains, now fully in professorial mode. "I would say that was more like a B. Still not the best work at all, but not bad."

But while Cope grades the work on a sliding scale, all of the chorales are derived from Bach, and for the most part, they sound like the composer's work. "They just have these little deviations, which come from mistakes," he adds. "Bach

would do these one time; this maybe does it twice, and therefore it doesn't sound quite right. The program is not statistically based, and therefore it will sometimes be very creative with these things." It's those "mistakes" that further blur the line between human and machine. Anomalies in composers' pre-defined rules are what allow music and musicians to evolve — they're also what keep Cope's programs from becoming too repetitious.

"The mistakes we make often are useless, but occasionally are extraordinary in making changes in the way music evolves and the way the human race evolves," explains Cope. "You can actually see that in music history. You can actually see a composer compose something that seems so bizarre; it's almost like they've made a mistake and then it becomes a major feature of their style." Computers, on the other hand, are designed to eliminate such aberrations. "In a way that's unfortunate," says Cope. "In my process, mistakes are included. They come out in the output, which makes it sound more human than otherwise."

In the years since designing EMI, Cope has further pursued the mysterious line that separates man and machine, fittingly continuing his human-based naming conventions with Alice, Sarah and, in 2003, Emily Howell, a nod to the program that started it all. "Howell is my father's first name and my middle name," explains the inventor. "It was a neat pairing of words because this program is interactive. I play an important role of interacting back and forth with the program."

Cope passes the knowledge (and love) of music down to those willing to learn, offering lessons at his Santa Cruz home.

Cope fires up Emily Howell, eager to show off his more recent creation. But where generating chorales with her predecessor was as simple as clicking "compose," Howell requires far more input. Through a series of dialog boxes, Cope slowly teaches her to speak in front of us. He enters phrases like "hello" and "hello, how are you?" and receives the sorts of responses one would expect from someone attempting to

learn our language. “Are how hello,” answers Emily Howell.

“Every time you input a word, or a note, or a chord or anything you’d like to define as a unit, it is placed within a kind of virtual node,” Cope explains. “These nodes are placed in the order in which they’re received, and they’re connected to every other node with a series of arbitrary, randomized weights.” The language in this case, is arbitrary. The dialog, instead, is intended to create associations inside the program; Cope has also done with music what he demonstrated with language for our benefit. It’s a much more involved process that can prove far more frustrating, but the results speak for themselves. Cope has had the A+ results performed by full choirs. You can buy them on iTunes and stream them on YouTube.

Of course, Emily Howell will never be J.S. Bach, no matter how many iTunes downloads she may move, but her A+ compositions have been more than enough to reignite the sometimes troubling questions posed by her predecessor. And in a sense, that’s precisely what has maintained Cope’s attention for all these decades.

“Part of the teacher’s job is to challenge students; to make them angry; to make them think for themselves,” says Cope. “And I saw the program actually doing this, making people think about these things, at least some of the people. Some had closed minds immediately, and that was that, and I felt that was really good, very healthy.”

Cope retired this year, after 46 years of working as a college professor. But he continues to teach, both in the classroom and through programs like Emily Howell. But as long as there are still questions to be answered, neither Professor Cope’s nor Emily’s jobs will ever be done.

“I’m working on another program now which will remain nameless because I don’t want people looking for it necessarily, because I don’t know if it’s going to be successful or not,” says Cope. “But I’m enjoying working on it, nonetheless.” D

Brian’s work has appeared in Spin, The Onion, Entertainment Weekly, The New York Press, PCMag, Laptop, and various other publications.

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SPACE IS THE PLACE

GROUND CONTROL TRANSMISSION

NASA/BILL INGALLS

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SPACE IS THE PLACE

GROUND CONTROL TRANSMISSION

We've been blazing quite a trail from Earth to the ISS lately and there's sure to be plenty more space traffic ahead, especially with Virgin Galactic's passenger flights on the horizon. Astronaut Chris Hadfield's recent return to Earth left us short a resident Space Oddity, but there's plenty of room left in orbit for a successor. Last week, a Soyuz rocket launched from Baikonur Cosmodrome in Kazakhstan with fresh crew members for the ISS. Commander Fyodor Yurchikhin (Roscosmos) and Flight Engineers Luca Parmitano (ESA) and Karen Nyberg (NASA) will call the station home until November, leaving just enough time to work out a harmony on "Rocket Man."

NASA/BILL INGALLS

MARK SETRAKIAN

The SPECIAL EFFECTS AND ROBOT EXPERT talks tools of the robot trade and cyberspace-augmented memory

What gadget do you depend on most?
Mostly my iPhone. But really I depend on my Haas VF-4SS, because you can't make a giant robot with a phone.

Which do you look back upon most fondly?
My Mac SE/30. Around 1990, I had it hooked up to a 19-inch greyscale CRT, and a Kurta tablet with about 100 Quick Keys macros around the perimeter of the pen area. System 6, Claris CAD, no internet, no email.

Which company does the most to push the industry?
Apple always seems to be five steps ahead of everybody, and their products have an elegance that belies how much work went into them. I have been devoted to Apple products for years, but lately I've taken a strong interest in Samsung (the clunky / awesome Galaxy Camera) and Microsoft (see below...).

What is your operating system of choice?
All of my engineering work is done in Windows 7 64-bit, often on a Mac with Boot Camp. Robot motion-control systems run under RT Linux. For everything else, OS X.

What are your favorite gadget names?
Tenori-on, a well-named piece of alien technology.

“When traveling … I used to bring 10 pounds of hardware with me wherever I went; now I really only need my phone.”

What are your least favorite?
Raspberry Pi — it’s a great device, but seriously…

Which app do you depend on most?
On my phone, Safari. My phone is mostly a conduit for information and Safari is almost the only app I need. But I also love specialty apps like iEngineer and Circuit Playground. On my computers, Autodesk Inventor and Max/MSP.

What traits do you most deplore in a smartphone?
It’s always on, always there, nagging with its unceasing onslaught of communication and its bottomless well of knowledge.

Which do you most admire?
See above.

What is your idea of the perfect device?
I like sharp tools. A device with focused function (some would say limited) and a user interface to suit the task, like a x0xb0x, or the Teenage Engineering OP-1. Can you tell my hobby is music?

What is your earliest gadget memory?
My dad had an ancient TV with a remote he referred to as a “clicker” that turned on the TV and changed the channel by literally making a clicking sound. I carefully took it apart and discovered tuned rods that would be struck when the buttons were pressed. It was purely mechanical; no batteries, no electronics.

What technological advancement do you most admire?
3D printing. I’ve been using a Stratasys FDM Titan machine for almost 10 years and it has completely changed the way I make things and the way I think about design in general.

Which do you most despise?
OS updates that render my favorite apps obsolete.

What fault are you most tolerant of in a gadget?
Limited functionality. If a device does one thing really well, I don’t mind if it doesn’t do much else.

Which are you most intolerant of?
An inconsistent user interface.

Setrakian's robot-building tool of choice, the Haas VF-4SS CNC machining center.

COURTESY OF HAAS AUTOMATION INC.

When has your smartphone been of the most help?
When traveling. I used to bring 10 pounds of hardware with me wherever I went; now I really only need my phone.

What device do you covet most?
Short of an SLS machine that prints titanium, the Fortus 900mc is the 3D printer of my desire. But like the Haas, it's not a pocket device.

If you could change one thing about your phone what would it be?
Honestly, I just wish it had a longer battery life.

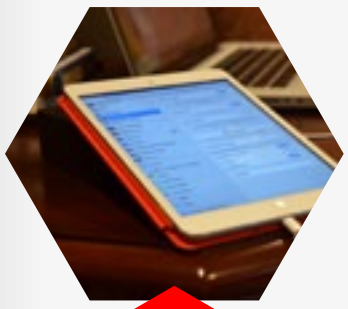
What does being connected mean to you?
I feel like cyberspace has become an extension of my memory. I know my own memories change over time, but being connected keeps people and experiences in my life alive in ways that I don't think were possible a decade ago.

When are you least likely to reply to an email?
When I'm focused on work, I often ignore my phone and my email for 12 hours at a time. It gets me in trouble sometimes.

When did you last disconnect?
While on vacation in New Zealand this year, I disconnected for a few days. Disconnecting for any significant period is almost unthinkable. D

IN REAL LIFE is an ongoing feature where we talk about the gadgets, apps and toys we're using in real life.

GLASS AND THE 2014 LEXUS IS



iPad mini

I'LL CONFESS: I have an open invitation to spend $1,500 on Google Glass due to my presence at I/O 2012. After using the set that Mr. Tim Stevens purchased, however, I decided to hold off. Recently, I had the chance to race Lexus' redesigned 2014 IS at the famed Rockingham Speedway in North Carolina, and *SlashGear's* own Vincent Nguyen rode shotgun in order to capture my lap via Glass.

You see, the new IS is a beast unto itself. The acceleration, handling and overall seating comfort have been markedly improved compared to the 2013 edition (which I also drove), and the technology used to help the vehicle corner better is immediately apparent once turning into The Rock's interior road track. But aside from strapping a bunch of GoPro cameras around, how's a guy to get a video of such an event? Glass was *made* for situations like this. Vincent could interact with me and enjoy the turns without worrying over his job as a videographer, and the camera itself did a satisfactory job of capturing what was going on. In fact, it was probably a bit *too* good — the smoothness of the capture downplays the pressure I was feeling when pressing through turns at nearly 60MPH.

Glass actually made a once-in-a-lifetime opportunity that much better. It captured the essence of the moment with aplomb, and simply got out of the way. Throughout the event, Glass managed to capture moments without breaking the concentration of those around. Something tells me that consumers at large are going to embrace wearables if pricing ever sinks south of the stratosphere. I witnessed around 10 folks from all walks of life — golfers, automotive technicians, PR professionals, waitresses, etc. — try Glass on for size. Not a single one of them reacted with anything short of wonder, amazement and pure exuberance. Which, incidentally, is exactly how I felt mashing the pedal to the floor on a vehicle that looks devilishly good with a red interior...

— Darren Murph

iPAD MINI

Glass and the 2014 Lexus IS

WHAT CAN MAKE the internet more awesome than it already is? A constant 4G LTE connection while traversing the real world. I tried the mobile hotspot thing for a while with my 4S, but quickly got tired of fumbling around with cables and the like. Plus, the handset gets quite hot under that kind of use. So, after considering the options on my existing provider (AT&T), I decided to use the iPad mini as a hotspot. Did I need another tablet alongside my second-gen iPad? Of course not, but then again, who wants 3G tethering? By doing this I've come out with much more speed and functionality — AT&T's MiFi Liberate may have a touchscreen, but the mini almost doubles its six-hour battery life. In the end, I actually purchased my data plan via Verizon at $30 per month for 2GB. For the same price, AT&T will provide a whole gigabyte more in data, but my decision with Verizon ultimately came down to the spectrum I wanted.

The biggest problem I have with regular MiFi units is their contracts. Comparing the $459 I paid outright for the mini with the $50 price tag on the Verizon Jetpack MHS291L and MiFi Liberate seems like an easy comparison, but those low prices assume two-year contracts. For month-to-month service, you're gonna pay $229 for the Jetpack — a small block of plastic — which is a bit less than half the price of the mini. That's a lot to consider when you're trying to come out on the winning end of a mobile connection purchase; carriers, units, amount of data, pricing and so on. Taking into account the fact that I can toggle my iPad mini data service on and off from month to month helps me justify the extra price of the iPad. Really, it depends on the person, but for me, purchasing the iPad mini as a hotspot first and tablet second has allowed me to get the most 4G bang for my buck.

— Andy Bowen

The week that was in 140 characters or less

Funky Fresh, Boring Bans and OS Cliques

DISTRO 06.07.13 | ESC | REHASHED

@mat_johnson
Amazon Fresh should not be confused with Amazon Funky Fresh, Delaware's most famous 80s female rap group.

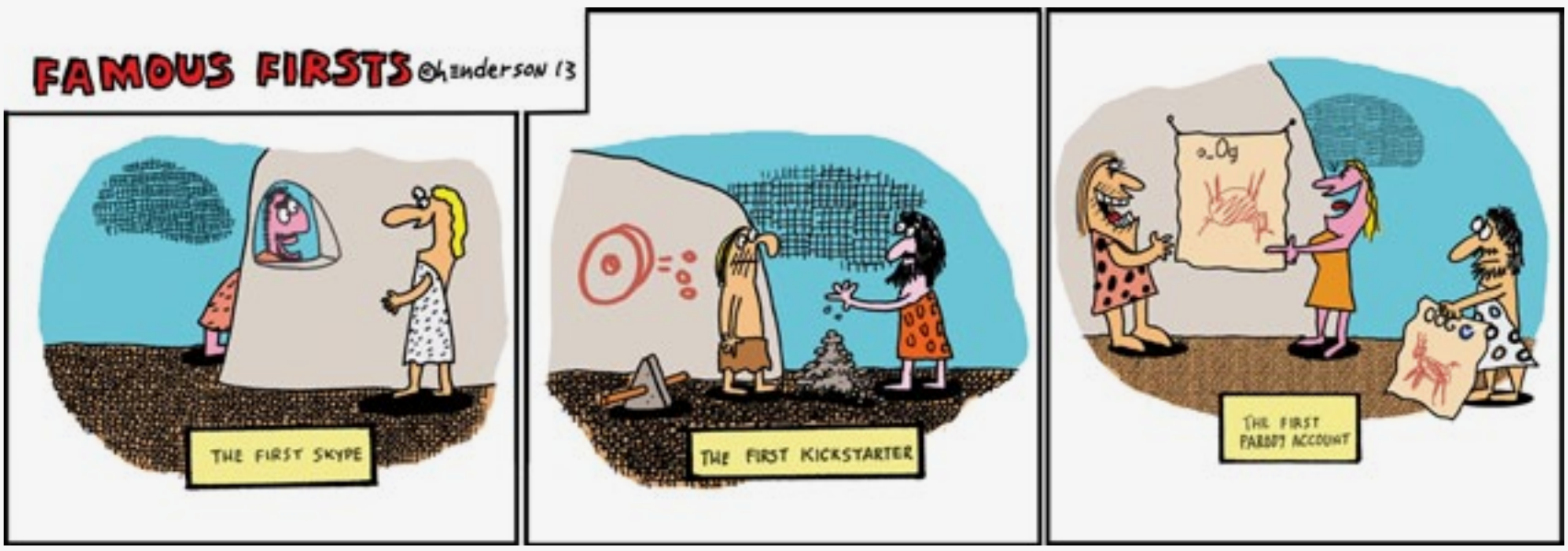
@seattlesybarite
Google Glass bans porn, casinos ban Google Glass. The future of mobile hands-free computing sounds kind of boring.

@chadschomber
If Apple's gonna launch a streaming music service, doesn't the established name "iTunes" work better than iRadio?

@Brentweets
Now that Android has Vine I'm pretty sure that means iPhone users legally have to move to another site.

@mattjavanshir
With the Oculus Rift & Virtuix Omni VR treadmill, we are mere moments away from stepping into the quantum leap accelerator and vanishing! :D

THE STRIP | BY SAM HENDERSON



WHAT IS THIS?

TOUCH TO FIND OUT

EVAN-AMOS/WIKIMEDIA

ATARI PORTFOLIO

The '80s saw a burgeoning market for computing as adventures in portability took us from BASIC-speaking pocket computers like the TRS-80 PC-1, to laptop-esque lunks like the 9-pound HP-110. But with Atari's 1989 release of the Portfolio, we got a first in the palmtop-sized world that offered MS-DOS compatibility via its DIP DOS operating system. This $400 clamshell had a 240 x 64-pixel LCD display, 128KB of built-in RAM, a wide range of third-party peripherals and a smattering of simple productivity apps. The no-frills portable has earned some die-hard fans, but never made a huge impact on the market. However, the Portfolio did get its 15-minutes of fame, making a cameo in *Terminator 2: Judgment Day* as John Connor's on-the-go hacking tool of choice.

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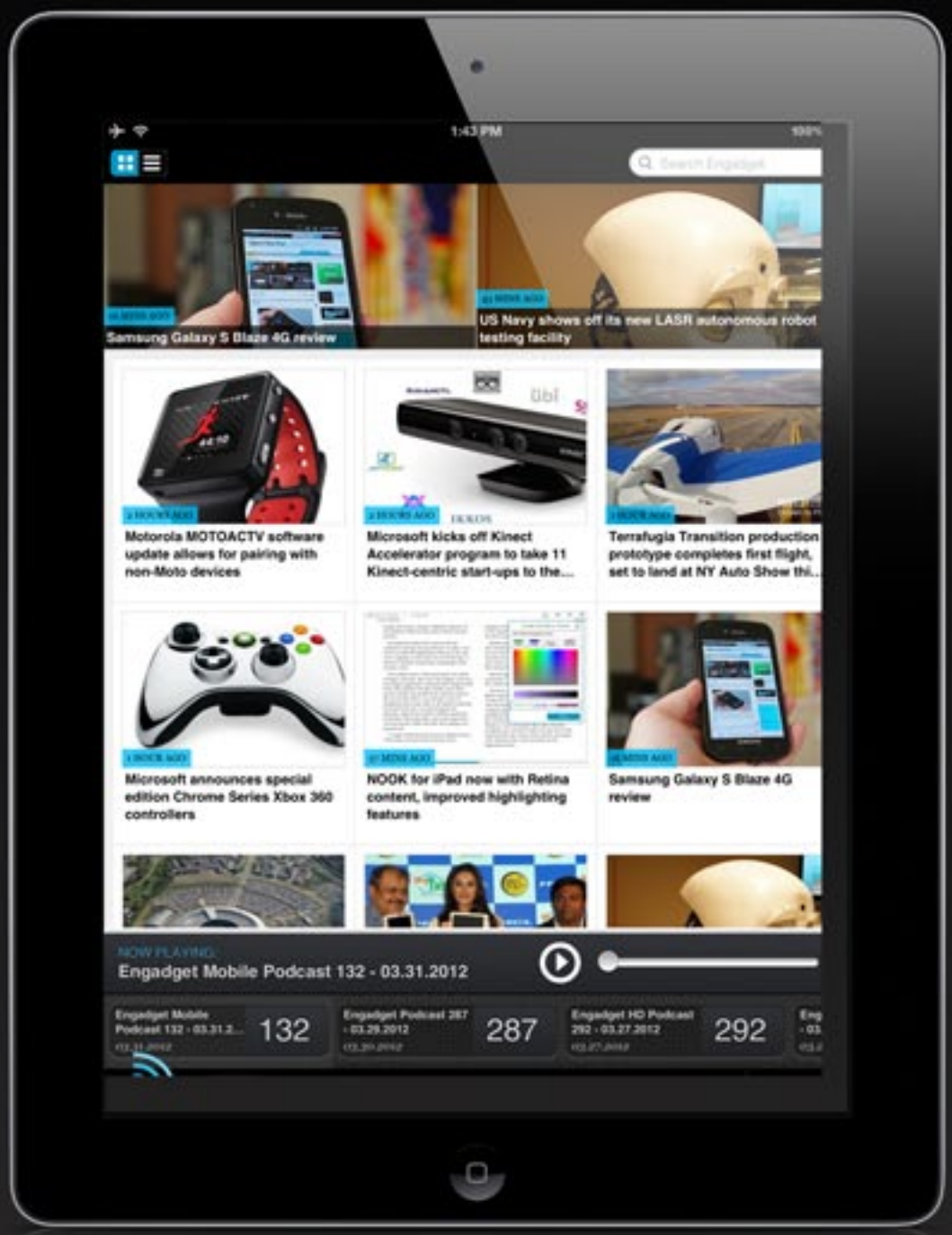

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